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ABSTRACT

This multidisciplinary, annotated bibliography is offered to K-12 teachers, other educators, librarians, concerned parents, and community leaders to simplify locating and acquiring marine education materials and infusing marine subjects into existing curricula. Included are printed materials currently available from commercial publishers, government agencies, or educational institutions. Unpublished materials prepared by teachers for use in their classes are also included. The document is divided into two major sections: five categories of resource materials and three indices to the materials (including author, curriculum area, and application indices). Entries within each of the five categories are generally grouped according to curriculum area and/or application, and then by increasing age of students. The five sections of bibliographic entries are: elementary (with separate listings for grades K-4 and 4-7); secondary (with separate listings for junior/senior high and high school/adult); general reference; library and special interest; and teacher-produced materials. Each entry includes: entry number, title, date, author(s), publisher, address, and annotation. Each annotation includes: key words for curriculum area and application; descriptive paragraph; number of pages or approximate time to complete work; who will use the item; and price range. A suggested K-12 spiral curriculum for science is also included in an appendix. (JN)

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FLORIDA MARINE EDUCATION RESOURCES BIBLIOGRAPHY

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TABLE OF CONTENTS

FOREWORD iv

INTRODUCTION 1

USER'S GUIDE 3

OTHER MARINE EDUCATION MATERIALS COLLECTIONS 5

LISTS OF MATERIALS

- Elementary (1000 Series) 6
  - Grades K-4 6
  - Grades 4-7 17
- Secondary (2000 Series) 32
  - Junior-Senior High School 32
  - High School - Adult 48
- General Reference (3000 Series) 65
- Library Materials (4000 Series) 77
- Teacher-Produced Materials (Letter Series) 80

INDICES

- Authors Index 87
- Curriculum Area Index 101
- Application Index 105

APPENDICES

- Suggested Spiral Curriculum for Science 107
- Bibliography Addition Sheet 113

FOREWORD

Florida has more than 1,300 miles of coastline and there is no area in the state located more than a two-hour car ride from the shore. This maritime environment exerts a tremendous influence on every aspect of our lives, not only from the scientific but also political, recreational, historical, economic and aesthetic standpoints.

This Marine Education Resources Bibliography is offered to the K-12 teacher, other educators, librarians, concerned parents and community leaders in an effort to help develop a citizenry aware of the marine environment. A citizen equipped with this knowledge and judgment would help to ensure wise stewardship of Florida's unique environment.

The bibliography was compiled with the assistance of educators nationwide and was overseen by Florida Atlantic University and Florida Sea Grant. As we strive for excellence in education, cooperative ventures such as this one will help us achieve this goal.

We gratefully acknowledge the cooperation of our colleagues who served on an advisory committee for the conduct of this project and contributed helpful reviews at all stages: Ms. Sue Gammisch, Virginia Institute of Marine Science; Mrs. Catherine Floyd, Franklin County Schools; Mr. Frank Kapp, Florida Department of Education; and Dr. William Lindberg, University of Florida.

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Pine Jog Environmental Sciences Center
Florida Atlantic University

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INTRODUCTION

The purpose of this document is to facilitate marine education. This multidisciplinary, completely annotated bibliography will simplify the tasks of both locating and acquiring materials and of infusing marine subjects into existing curricula. All subjects and grade levels are covered. A special supplement developed expressly for this document is the "Suggested Spiral Curriculum," prepared to assist educators develop marine and coastal-related instruction for grade levels K-12 (see Appendix I).

Who Should Use It? Everyone! Teachers at all grade levels; teachers of social studies, science, math, history, language arts, music, vocational/technical subjects, art; librarians looking for fiction and fact; parents looking for good childrens' books; ANYONE interested in the seas.

What's In It? Printed materials currently available from commercial publishers, government agencies, or educational institutions. Many unpublished materials are included that were prepared by teachers for use in their classes. These teachers are willing to share their classroom-tested materials, thus saving others from duplication of efforts. A suggested K-12 spiral curriculum is included to supplement the bibliography.

What Isn't In It? There are no audio-visual materials listed. There are no periodicals and no articles from periodicals. Nothing listed is out of print. Every item is currently available, printed on paper, directly from the publishers.

Why Isn't So-and-So Listed? There are several possible reasons:

1. The item is out of print.

2. Lack of knowledge. The writers make no claim to omniscience. If there are omissions of good materials, please remedy this by mailing the form found in the back of this bibliography. The entries will be supplemented and updated as additional information is received and as new materials are published.

3. Localized coverage. The materials need considerable adaptation for use in Florida, or similar materials are available that are readily usable.

4. Poor review. The items included here have been recommended by teachers who use them or who have reviewed them. Many items were not included because reviewers felt other materials more effectively accomplish the same goal.

Where Can I See That Book? Every item listed (except the "Library" section) in the bibliography is in the Marine Education Resource Center, 2335 Norman Hall,

College of Education, University of Florida, Gainesville, Floirda. Anyone may look through the materials there. Teachers may obtain staff development funds for a trip to Gainesville for that purpose or the materials can be brought to you for an in-service workshop. To arrange for in-service workshops, contact Dr. John Koran, c/o the Center (904) 392-0761.

What Is the Spiral Curriculum? It is a list of topics suggested for inclusion in marine science education for each grade level, and may be especially useful to teachers new to the field, or even to the state.

USER'S GUIDE

This document is divided into two major sections: a series of five categories of resource materials, and three indices to the materials.

Bibliographic Entries

Within each of the five categories of materials, entries generally are grouped according to curriculum area and/or application and then by increasing age of the students.

The five sections of the bibliographic entries are:

1000 series: Elementary grades
2000 series: Secondary grades
3000 series: General reference
4000 series: Library and special interest. (Not included in the Marine Education Resource Center)
Lettered (A-N) series: Teacher-produced materials developed for their classes. Each packet contains several items that pertain to general subject area.

Each bibliographic entry includes: Entry Number, Title, Date, Author(s), Publisher, Address, and Annotation.

Each annotation includes: key words for curriculum area and application; descriptive paragraph; number of pages or approximate time to complete work; who will use the item; price range.

Generally, the entries are arranged by curriculum area and/or application, and progress from the youngest to oldest age level.

Codes Used in Annotations

Keywords. Define the curriculum area and the application or use of the item. (See the appropriate index.)

Curriculum Area

Art	History	Physics
Biology	Language Arts	Social Studies
Botany	Math	Special Education
Chemistry	Multidisciplinary	Vo-Tech
Ecology	Music	Zoology
Geology	Oceanography	

Application

Activity: Designed to enhance information learned in class, lab, or field.
Field: Outdoor activities, instruction, trip sites, and procedures.
Identification Guide: Taxonomy of plants and animals.
Laboratory: Experiments/hands-on application of classroom and field information.
Reading: Practice in language arts.
Reference: Source of information for teacher/student
Text: Instructional reading material.
Textbook: Structured for use as the basis for a course, usually with chapter questions, tests, vocabulary, and teacher's guide or edition.
Unit: A group of lessons on a particular subject, usually with chapter questions, tests, vocabulary, and a teacher's guide or edition.

Item Use (whether teacher or student, and grade level)

T = Teacher
S = Student

P = K-3
U = 4-6
I = 7-9
H = 10-12
A = advanced high school or adult

Price Range

Free = one copy on request
$0-5
$5-10
$10-20
$20-30
Over $30

Cross Reference

Index material is arranged by author, curriculum area, and application. To facilitate rapid retrieval of an item, entry numbers in series "1000" and "2000" are listed under both curriculum area and application. For example, to find marine zoology labs for high school, look for "2000" numbers under "Zoology" in the Curriculum Area Index, and for the same numbers under "Laboratory" in the Application Index. (You would determine, for instance, that entry number 2172 fits this category.)

Please note that because "3000" numbers are all general reference materials, it is not necessary to list them in the reference cross index. No teacher-produced materials appear in the cross reference section either.

OTHER MARINE EDUCATION MATERIALS COLLECTIONS

I. Virginia Institute of Marine Sciences houses the Marine Education Materials Systems (MEMS) which is devoted primarily to K-12 marine education. Cooperation from various state Sea Grant programs and from marine educators across the country has helped to build this collection since 1977. MEMS contains articles, papers, units and some books. The system is computerized by subject area, grade level, and application, along with publisher and annotation. Microfiche and paper copy may be purchased. For information, contact:

MEMS Director
Marine Education Center
Virginia Sea Grant at VIMS
College of William and Mary
Gloucester Point, VA 23062
(804) 642-2111, ext. 111

II. Educational Resources Information Center (ERIC) has a broad range of environmental education materials including those produced in Florida with Environmental Education Mini-Grants. The system is computerized and materials may be purchased on microfiche or paper. For information, contact:

ERIC, Ohio State University
College of Education
1200 Chambers Road, 3rd Floor
Columbus, OH 43212

ELEMENTARY GRADES, K-4

1000. THE WATER-SONG BOOK, 1981, Dale and Linda Crider; Anhinga Roost Music Company, Rt. 2, Box 342T, Gainesville, FL 32601.
Music, Ecology, Social Studies; Reading, Activity. Original songs with accompanying text that teach conservation of Florida's wetlands in an innovative manner. 52 pp.
T,S:P,U,I,H,A $5-10/book
$5-10/cassette

1001. COASTAL AWARENESS: A RESOURCE FOR TEACHERS IN ELEMENTARY SCIENCE, 1978, Frederick Rasmussen; Office of Coastal Zone Management, NOAA, 3306 whitehaven St., N.W., Washington, DC 20235.
Ecology; Reference, Unit. Thirty pages of text gives teacher an overall view of coastal habitats, water and sand movement, life zones and for field trips. The bibliography is good but somewhat out-of-date. There are lists of various types of resources available. 84 pp.
T:P,U Free

1002. FISHY ACTIVITIES FOR YOUR SMALL FRY, 1979, Mary E. Sparrow, Frances L. Lawrence; Virginia Institute of Marine Science, Gloucester Point, VA 23062.
Zoology, Unit, Activity. Has general information on fish and directs student learning of fish anatomy, life history and adaptation by making observations and drawing inferences. Booklet includes games, puzzles, arts and crafts, and tests. Supplementary slide program and worksheets are available for additonal cost. 36 pp.
T:P,U $0-5

1003. SENSING THE SEA, KINDERGARTEN AND GRADE ONE, 1979. Ellen Odell-Fisher, Ronald L. Giese; Virginia Institute of Marine Science, Gloucester Point, VA 23062.
Ecology; Unit, Activity. Three to four weeks of well-planned, brief, clearly explained activities to arouse student curiosity about the aquatic environment. Student learns by doing fun activities using simple materials. Leading questions are provided for teacher to stimulate student observation. Activities are centered around classroom aquarium and explicit, easy directions are given for aquarium set-up. 45 pp.
T,S:P $0-5

1004. SENSING THE SEA, GRADES TWO AND THREE, 1978, Ellen Odell-Fisher, Ronald L. Giese; Virginia Institute of Marine Science, Gloucester Point, VA 23062.
Ecology; Unit, Activity. Three to four weeks of well-planned, brief, clearly explained activities to arouse student curiosity about the aquatic environment. Student learns by doing fun activities using

simple materials. Leading questions are provided for teacher to stimulate student observation. Activities are centered around classroom aquarium and explicit, easy directions are given for aquarium set-up. 45 pp.
T,S:P,U $0-5

1005. A SEA CREATURE TREASURY, 1982, Project CAPE, Dare County School District, P.O. Box 40, Manteo, NC 27954.
Zoology, Multidisciplinary; Unit. Fifteen lessons on various marine invertebrates. Each lesson has goals, objectives, materials list, vocabulary, and brief background information for the teacher. Most of the materials for activities are readily available but some do require live animals. Transparency/duplicating masters for student work are included. 102 pp.
T,S:P $0-5

1006. MARINE SCIENCE FOR FIRST GRADE, Duval County Marine Center, 1347 Palmer St., Mayport, FL 32233.
Zoology; Unit. Introduces children to marine animals; what they look like, feel like, how they move, how they get food. Teacher will need to obtain animal specimens and shells. Activities are well described and transparency masters are included. Has book and music bibliography. 4-6 periods.
T:P Free

1007. MARINE SCIENCE FOR SECOND GRADE, Duval County Marine Center, 1347 Palmer St., Mayport, FL 32233.
Oceanograpy; Unit. Gives student a feel for the vastness of the sea and explores some aspects of the sea floor, the shore, animals, tides, currents, and resources. Unit has complete outline for course of study and activities are described. Transparency masters, book and music bibliographies are included. 4-6 periods.
T:P Free

1008. MARINE SCIENCE FOR THIRD GRADE, Duval County Marine Center, 1347 Palmer St., Mayport, FL 32233.
Ecology; Unit. Directs observations of marine organisms with emphasis on diversity, similarities and differences, and adaptations for aquatic existence. Animal specimens are needed. There are several activities described, transparency masters, book and music bibliographies and 2 suggested field trips. 4-6 periods.
T:P Free

1009. ANIMALS WITH SHELLS, KINDERGARTEN, Project COAST, College of Education, Univesity of Delaware, Newark, DE 19711.
Zoology, Multidisciplinary; Unit. Several activities introduce students to the structure and functions of mollusk shells. Sensory exercises, art, discrimination, language arts and visual aids are all used. Various class periods.
T,S:P $0-5

1010. THE DUNES AT PLAY, Project COAST, College of Education, University of Delaware, Newark, DE 19711.
Geology, Multidisciplinary; Unit. Students are taught how sand dunes change through a story and a play. Unit contains teacher background, slides, transparency master and supplementary language arts and activities. 2-3 periods.
T,S:P $0-5

1011. NOT-SO COMMON OYSTER, Project COAST, College of Education, University of Delaware, Newark, DE 19711.
Zoology, Language Arts; Unit. A two-hour directed independent study of oysters. There is also teacher background information, directions for making this a class reading lesson and many multidisciplinary activities to infuse a "science" topic into other disciplines. 4 or more periods.
T,S.:P,U $0-5

1012. THE HORSESHOE CRAB, Project COAST, College of Education, University of Delaware, Newark, DE 19711.
Zoology; Unit. Natural history and life cycle are introduced with poetry. In-depth study done with independent and group research. Transparency masters and text for the teacher assure that study has received adequate information. Quiz included. 5 or more periods.
T,S:P,U $0-5

1013. WATER WORLD CREATURES, 1982, Project CAPE, Dare County Schools, P.O. Box 640, Manteo, NC 27954.
Zoology; Unit. Twenty-four lessons explore various marine vertebrates. There are multidisciplinary activities in separate booklets and more than 40 transparency masters. 90 or more pp. total.
T,S:P,U $0-5

1014. LITTLE JOHNNY RAINDROP, Marilyn Lasky; Lee County Environmental Center, 2055 Central Ave., Ft. Myers, FL 33901.
Oceanography; Text. Story of water cycle told with large print and simple illustrations for beginning readers. Has easily reproduced waterwheel for students to make. Available in English, Spanish, or French. 1 period.
S:P $0-5

1015. TYPES OF AQUATIC LIFE, William R. Fryar; Lee County Environmental Center, 2055 Central Ave., Ft. Myers, FL 33901.
Ecology; Unit. Programmed learning booklet leads student through food chains, specific fresh water organisms, and into the nutrient cycle. 1 period.
S:P,U $0-5

1016. BEHAVIOR, K-3 CURRICULUM PACKET, Sea World, 7007 Sea World Dr., Orlando, FL 32809.
Zoology; Unit. Background information on behavior or marine mammals written for teacher. Handouts (masters) for students illustrate the animals and provide some written information. Also has handouts on training marine mammals. 14 pp.
T,S:P Free

1017. ADAPTATIONS, K-3 CURRICULUM PACKET, Sea World, 7007 Sea World Dr., Orlando, FL 32809.
Ecology; Unit. Background information for the teachers, handouts, games and multidisciplinary activities are used to learn about marine animal adaptations for survival. Emphasis is on marine mammals. 22 pp.
T:S:P,U Free

1018. WHALES, K-3 CURRICULUM PACKET, Sea World, 7007 Sea World Dr., Orlando, FL 32809.
Zoology; Unit. Teachers' background information on dolphins and whales, particularly killer whales. It has handouts for the students including one comparing marine mammals to fish. 133 pp.
T,S:P,U Free

1019. MARINE ECOLOGY, K-6 CURRICULUM PACKET, Sea World, 7007 Sea World Dr., Orlando, FL 32809.
Ecology; Unit. Background information for teachers plus handouts on marine organism life styles. Topics include locomotion, protection, feeding, breathing. Many multidisciplinary activites and games. 32 pp.
T,S:P,U Free

1020. ALONE ON THE SHORE: A SURVIVAL PACKET FOR EDUCATORS, 1979, Julia Steed Mawson, Priscilla Artz, UNH Sea Grant; Dr. John Koran, SSTE, Norman Hall Rm. 353, University of Florida, Gainesville, FL 32611.
Multidisciplinary; Field. A sample "agenda", suggestions on field trip procedure and a collection of 19 activities to sharpen observation, learn basic concepts and simply get acquainted with the coast. Each activity has a materials list (simple and minimal) and explicit instructions. There are sensory, shoreline, quiet time and high tide activities. 9 pp.
T:P,U $0-5

Entries 1021-1026 comprise units built around field trips with personnel trained in fieldwork. These materials have been available with Title IV-C Adopter Grants and several Florida districts have adopted them. All of these units have a printed booklet for the teacher which includes instructions, copies of all student materials, scripts for slide shows and directions for classroom activities. All give a brief list of what will be done in the field and copies of tests with answer sheets. The booklets themselves are low cost with classroom preparation not adequate without the slides and other materials. These units are very good if done with adequate field time with a trained and equipped teacher. Order from the Martin County Environmental Studies Center, 2900 N.E. Indian River Dr., Jensen Beach, FL 33457.

1021. KNOW YOUR ENVIRONMENT: KINDERGARTEN
Ecology; Field, Unit. Classroom preparation for a field trip is done with slide shows, picture booklets (teacher has script) and feltboard pieces. A test and a brief listing of field activities are included. 5 periods plus field trip.
T,S:P $10-20

1022. HABITATS; FIRST GRADE
Ecology; Field, Unit. Classroom preparation for a trip to marine grass flats is done with slide shows, student workbooks, feltboard pieces and

animal flash cards. Concepts of "Living--Non-living" and "Habitat" are taught. Brief listing of field activities is given. Slide show scripts, tests, complete instructions for everything but fieldwork are in a booklet. 5 periods plus field trip.
T,S:P $10-20

1023. COMMUNITIES; SECOND GRADE
Ecology; Field, Unit. Two-week program packet of five units--vocabulary, habitat, adaptation, community and organism identification-to be correlated with field trips. Classroom preparation is done with slide shows, student workbooks, flashcards and feltboard pieces. Slide show scripts, tests, and complete instructions for everything but fieldwork are in a booklet.
T,S:P $10-20

1024. GRASSFLAT COMMUNITY; THIRD GRADE
Ecology; Field, Unit. A two-week program packet of four units--saltwater grassflats, vocabulary, food chains and seining--to be correlated with field trips. Classroom preparation is done with slide shows, student workbooks, flashcards and feltboard pieces. Slide show scripts, tests, and complete instructions for everything are in a booklet.
T,S:P $10-20

1025. VOCABULARY FLASH CARDS; SECOND GRADE
Ecology; Activity. 8-1/2" x 11" card set to be used as part of #1023. Words are: habitat, oxygen, community, gills, environment, adaptation, scales, lungs.
S:P $5-10

1026. ANIMAL FLASH CARDS; THIRD GRADE
Zoology; Activity. Eleven picture cards of common grassflat organisms with comments on habitat, habit, and food to be used as part of #1024.
S:P $5-10

1027. COASTAL ECOSYSTEMS, 1981, Project CAPE, Dare County Board of Education, P.O. Box 640, Manteo, NC 27954.
Ecology; Field, Activity. Detailed directions for field trips to four types of coastal areas with student booklets designed for each area. There are explicit, pictoral instructions for setting up a marine aquarium, even in a gallon jug, so that students may closely observe animals found on field trips. Easy to use follow-up activities are described. Can be used for one class period or many days.
T,S:P $0-5

1028. MUD FLAT GUIDE: PRODUCERS, CONSUMERS, DECOMPOSERS; THIRD GRADE, Lee County Environmental Education Center, 2055 Central Ave., Ft. Myers, FL 33901.
Ecology; Field. Paperback large format booklet of drawings and simple phrases about each organism. They are grouped as producers or consumers; and students are told to look for evidence of decomposers at work. All organisms have size indicated and there is a measuring line on each page.
S:P $0-5

1029. OCEANS; A NEW TRUE BOOK, 1982, Katharine Carter; Childrens Press, 1224 W. VanBuren St., Chicago, IL 60607.
Oceanography; Reference. Simple text addressing oceans' profile, tides, currents, organisms and man's use is accompanied by beautiful color photos and graphics. Vocabulary and index. 47 pp.
S:P $5-10

1030. I CAN READ ABOUT; OCTOPUS, 1981, J. I. Anderson; Troll Associates, 320 Route 17, Mah Wah, NJ 07430.
Language Arts; Unit. Cassette tape with ten illustrated paperback read-along books. A teacher's guide includes vocabulary development, reading comprehension and phonics exercises. Single book cost $1.25. Other units include whales, dolphins and sharks.
T,S:P $10-20

1031. SEASHELLS IN ACTION, 1973. Audrey Newell; Walker Publications, 720 5th Ave., New York, NY 10019.
Zoology; Reading, Reference. Watercolor illustrations and text for each of 25 mollusks give a feeling for the diversity exhibited by these animals as well as help children recognize that shells are part of living animals. This can be read aloud to a class and used along with a study of sea shells. 39 pp.
T,S:P,U $5-10

1032. SHELLS ARE SKELETONS, 1977, Joan Victor; Crowell Junior Books Group, 10 E. 53rd St., New York, NY 10022.
Zoology; Reference. Part of Let's Read and Find Out Series. Good information about mollusk anatomy, morphology and life history pleasantly delivered along with accurate drawings. 33 pp.
S:P $5-10

1033. A FIRST LOOK AT SHARKS, 1979, Milicent Selsam; Walker and Co., 720 5th Ave., New York, NY 10019.
Zoology; Reference. Black and white illustrations correlated with text encourage observation in the beginning reader and help him learn how scientists classify organisms. Other similar books are A FIRST LOOK AT WHALES and A FIRST LOOK AT FISH. 32 pp.
S:P $5-10

1034. BARRACUDA: TIGER OF THE SEA, 1981, Francine Jacobs; Walker and Co., 720 5th Ave., New York, NY 10019.
Zoology; Reading, Reference. This highly recommended book presents accurate information on the life history of this toothy critter in a flowing, poetic style. A good selection to be read aloud. 48 pp.
S:P $5-10

1035. TUGA THE TURTLE, Dorothy Bjur; University of Southern California, University Park, Los Angeles, CA 90007.
Special Education; Reading. Braille pictures and text personify the adventures of a baby sea turtle in a tide pool. Includes pictures of the turtle, anemone, sea urchin, starfish, hermit crab and sea hare. Has been recommended for use with gifted students. 11 pp.
S:P unknown

1036. STRANGE MONSTERS OF THE SEA, 1979, Richard Armour; McGraw-Hill, 1221 Avenue of the Americas, New York, NY 10020.
Zoology; Reading. A teacher will enjoy reading this to the class as much as students will enjoy listening or reading themselves. Delightful action filled drawings combined with charming poetry. 40 pp.
S:P,U $5-10

1037. THE CRAB FROM YESTERDAY, 1979, John F. Waters; Frederick Warne Co., 2 Park Ave., New York, NY 10016.
Zoology; Reading. Accurate information imparted with a story of one old female horseshoe crab, her life and what happened to her when she was caught. Human focus is a young boy. Color and black and white illustrations enhance the story whether student is reading or teacher is reading aloud. 36 pp.
T,S,:P,U $5-10

1038. SEWER SAM, THE SEA COW, 1979, Francine Jacobs; Walker Publishing Co., 720 5th Ave., New York, NY 10019.
Zoology; Reading. Lots of accurate information given in this story about a manatee growing up. Black and white drawings enhance the story and help children visualize the manatees' size and bulk. Good selection to read aloud to the class. 48 pp.
T,S.:P $5-10

1039. IF YOU ARE A HUNTER OF FOSSILS, 1981, Burd Baylor, Peter Parnell; Scribner's, Vreeland Ave., Totowa, NJ 07512.
Language Arts, Geology; Reading. Conveys in poetry the wonder of change from sea bottom to Iowa farm to Texas mountains. The illustrations superbly enhance the text in content and feeling. They should be viewed more than once from various distances to absorb their permutations. A union of ideas, words and art that can be enjoyed by readers of all ages. 25 pp.
T,S:P,U $10-20

1040. BIG BOOK OF SUBMARINES, 1955, Jack McCoy; Grosset and Dunlap, One Grosset Drive, Kirkwood, NY 13795.
History; Reference. History of combat submarines and deep sea exploration vessels. Color pictures and detailed diagrams. 26 pp.
T,S:P,U $0-5

1041. THE BOTTOM OF THE SEA, 1966, Augusta Goldin; Thomas Y. Crowell, 10 E. 53rd St., New York, NY 10022.
Geology; Reference. Clear and Exciting physical description of the underwater world, its cliffs, canyons, coral reefs and the technology used to unravel its mysteries. Excellent illustrations and extensive vocabulary. 34 pp.
S:P $5-10

1042. FISHING AROUND THE WORLD, 1972, Louise Floethe; Scribners, One Vreeland Ave., Totowa, NJ 07512.
Vo-tech, Social Studies; Reference. Worldwide fishing techniques. A different land is featured on each page; its geography and industry are explored with simple text and attractive illustrations. 40 pp.

1043. HENRY-FISHERMAN, A STORY OF THE VIRGIN ISLANDS, 1949, Marcia Brown; Scribners, One Vreeland Ave., Totowa, NJ 07512.
Social Studies; Reading, Reference. A young boy is the focus of this colorfully illustrated story about life on a Caribbean Island. It captures the flavor of daily life, fishing, island markets and growing up. 30 pp.
S:P,U $5-10

1044. NORTH, SOUTH, EAST AND WEST, 1966, Franklin M. Branley; Thomas Y. Crowell, 10 E. 53rd St., New York, NY 10022.
Physics; Activity. This book defines the points of the compass and relates them to everyday life. The reader is shown how to use a compass and read a map in simple language and large illustrations. Good outdoor activities. 33 pp.

1045. ELEMENTARY TEACHERS' GUIDE, HO' I ANA IKE KAI, 1979, Rose Pfund; Sea Grant College Program, University of Hawaii, Honolulu, HI
Social Studies; Unit. Two major subject areas, life support and seamanship, are developed with text, field trips, activities and simple experiments. Detailed directions and drawings are provided. Individual topics can be infused into various studies. Although the emphasis is Hawaiian, the material can be used to learn about the state or can be easily adapted to Florida. 19 topics.
T,S:P,U,I $0-5

1046. THE CRUISE OF MR. CHRISTOPHER COLUMBUS, 1972, Sadyebeth and Ansen Lowitz; Lerner Publications, 241 First Ave., N., Minneapolis, MN 55401.
Social Studies; Reference. Pen and ink drawings enhance this adventure story. Good selection to read aloud. 80 pp.
T,S:P $0-5

1047. ARION AND THE DOLPHINS, Lonzo Anderson, Scribners, 591 Fifth Ave., New York, NY 10017.
Language Arts; Reading. An ancient Greek legend.
S,U,I $5-10

1048. PIRATES, 1977, Brenda Thompson; Lerner Publications, 241 First Ave., N., Minneapolis, MN 55401.
Social Studies; Reference. Information on privateers and buccaneers accompanied by colorful drawings and a good Caribbean map. 22 pp.
S:P $5-10

1049. TALL SHIPS: A CULTURAL, HISTORICAL VIEW OF OUR MARINE ENVIRONMENT, 1976, R. Boragine; Massachusetts Cooperative Extension Service, Sea Grant College Program, MIT, Bldg. E 38, Rm. 302, Cambridge, MA 02139.
Social Studies, Multidisciplinary; Activity. Designed to use with a unit on seafaring, exploring, piracy, sailing ships and voyages. Activities could also be used to supplement other history studies such as the Columbus and Mayflower voyages. Includes sea chanteys, art, language arts, social studies activities. 31 activities.
T:U,I $0-5

1050. SHIPS THROUGH THE AGES, Project COAST; 104 Willard Hall Ed. Bldg., University of Delaware, Newark, DE 19711.
Social Studies; Unit. Text traces history of boats from log dugouts to clipper ships. Transparency masters and multidisciplinary activities reinforce learning. Various class periods.
T,S:P,U $0-5

1051. SHIPS AND SEAWAYS, Project COAST; 104 Willard Hall Ed. Bldg., University of Delaware, Newark, DE 19711.
Social Studies; Unit. A self-teaching program about oceangoing vessels that includes text, slides, transparency masters and activities which use language arts, art, music and math. Five class periods.
T,S:P,U $5-10

1052. LANGUAGE ARTS ACTIVITIES TO SUPPLEMENT COAST LEARNING EXPERIENCES, Project COAST; 104 Willard Hall, Ed. Bldg., University of Delaware, Newark, DE 19711.
Language Arts; Reference, Activity. This is a list of the language arts activities included in other units developed by COAST and it gives directions for 14 additional exercises for developing language skills using marine oriented reading. Many K-6 books are included, some of which can be found in most school and public libraries. Various class periods.
T,S:P,U $0-5

1053. FAIRY TALES OF THE SEA, 1981, TAMU-SG-81-402, Sea Grant College Program, Texas A&M, College Station, TX 77843.
Language Arts; Reading, Activity. Twenty-five delightful tales gathered from around the world along with a teacher's guide to activities appropos to the stories which develop writing, speaking, reading and listening skills. The activities do not require special materials and have a wide age, time and ability range. 150 pp.
T,S:U,I $0-5

1054. CHILDREN'S LITERATURE--PASSAGE TO THE SEA, TAMU-SG-80-401, 1980, Norma Bagnall; Sea Grant College Program, Texas A&M, College Station, TX 77843.
Language Arts; Activity. Thirty-nine mulstidisciplinary activities to be used independently or as supplements to one or more of eight books. Included are games, simple construction experiments and art projects. 56 pp.
T,S.:U,I $0-5

1055. WIDER THAN THE SKY, 1968, Early, Srygley and Wenzel; Harcourt, Brace Jovanovich, Inc., 757 3rd Ave., New York, NY 10017.
Language Arts; Reading. A literature book of stories and poems. This is included as a reminder to look in "readers" for marine related stories. Five marine stories totaling 511 pp.
S:U $10-20

1056. LUTHER TARBOX, 1977, Jan Adkins; Scribners, One Vreeland Ave., Totowa, NJ 07512.
Language Arts; Reading. A charming story of a veteran lobsterman, a foggy day, boats in trouble, sea songs, with a giggle at the end. The

illustrations are both accurate and at the same time convey the story's feeling. The reader will absorb quite a bit of sea lore from this story. 32 pp.
T,S:P,U $5-10

1057. NOAH'S ARK, 1977, Peter Spier; Doubleday, 245 Park Ave., New York, NY 10017.
Language Arts; Reading. The beginning of the book has an old Dutch poem, "The Flood," but the story is really told in detailed pictures with humorous touches to look at again and again, even by adults. Many supplementary activities are described in CHILDRENS LITERATURE-PASSAGE TO THE SEA by Norma Bagnall. 40 pp.
T,S:P,U,A $10-20

1058. ART AND THE MARINE ENVIRONMENT, Project COAST; 104 Willard Hall Ed. Bldg., University of Delaware, Newark, DE 19711.
Art; Activity. Many of these projects are excellent follow-ups of a beach field trip but can also be used with ordinary materials brought in by students. Twenty-five projects.
T,S:P,U $0-5

1059. THE WPF COLORING ALBUM, 1980, Center for Environmental Education, Educational Materials, 1925 K. St., NW, Suite 205, Washington, DC 20006.
Zoology, Art; Activity, Reading. This coloring book contains separate sheets for each of 13 species of whale, with a brief bilingual (English-Spanish) factual paragraph on the reverse side plus eight sheets on whaling and conservation techniques.
S:P $0-5

1060. DISCOVER THE ATLANTIC OCEAN, Sea Gant Extension Division; Virginia Polytechnic Institute and State University, Blacksburg, VA 24061.
Oceanography, Art; Activity. In this coloring book are accurate, labeled drawings of plants and animals, most of which occur in Florida. In addition there are two pages of various fishing methods. 38 pp.
S:P,U $0-5

1061. SEASHORE LIFE COLORING BOOK, 1973, Anthony D'Attilio; Dover Publications, 180 Varick St., New York, NY 10014.
Biology, Art; Activity. This coloring book contains 46 scenes with more than 200 drawings. Specimens of any one plate are not necessarily found in the same body of water and sometimes relative sizes are not correct. Each plate displays the names of the organisms represented and the back page shows each plate in the proper colors to which the student may refer.
S:P,U $0-5

ELEMENTARY GRADES, 4-7

1062. MARINE ECOLOGY RESEARCH: ELEMENTARY CURRICULUM, 1981, Alameda County Schools; 685 A St., Hayward, CA 94541
Ecology; Text. This is a student inquiry and exercise text complete with teacher's guide, information for the student, directions for all investigations and field work, references, activities and lists of information sources.
T,S:U $0-5

1063. MARINE SCIENCE FOR FOURTH GRADE, Duval County Marine Center; 1341 Palmer St., Mayport, FL 32233.
Oceanography; Unit. Theory of ocean formation is investigated which leads the student into the study of oceans today, topography, ocean currents, constant change and the relationship of Florida life with the sea. Supplementary activities and test and transparency masters are included. 18 pp.
T:U Free

1064. MARINE SCIENCE FOR THE FIFTH GRADE, Duval County Marine Center; 1347 Palmer St., Mayport, FL 32233.
Oceanography; Unit. This is a guide to understanding our oceans and the life within them through studies of plankton, marine resources, tools and equipment, and the relationship of sea life to non-living factors in the environment. Test and transparency masters are included.
T,S:U Free

1065. THE MARINE SCIENCE EDUCATION CENTER GUIDEBOOK FOR FIFTH GRADE, 1975, Duval County Marine Center; 1347 Palmer St., Mayport, FL 32233.
Oceanography; Unit, Field. Three units provide an overview of oceanography. Included are: background information for the teacher, class and beach activities, transparency masters, vocabulary development exercises and bibliography. Materials ordinarily provided in kit form from the Center are listed and easily obtained elsewhere. 57 pp.
T,S:U Free

1066. OUR WORLD IN A FISHBOWL, 1979, R. Cole and r. Gardella; New Jersey Sea Grant, New Jersey Marine Science consortium, Fort Hancock, NJ 07732.
Ecology; Unit, Field. Using text, inquiry, simple experiments, the student learns about photosynthesis, respiration and food chains. The student progresses to marsh food webs and trophic pyramids. Also included is a trip to a saltmarsh with pages of identified organisms, food web worksheets and a bird adaptation section. 45 pp.
S:U $0-5

1067. TEACHERS' ACTIVITY GUIDE TO COASTAL AWARENESS: MARINE BULLETIN NO. 23, 1977, Sara Callaghan; Coastal Resources Center, University of Rhode Island, Kingston, RI 02881.
Multidisciplinary; Activity. Background information for teacher on coasts, beaches, estuaries, resources, plants and animals is provided along with many activities for students to learn by doing. Nineteen topics each with activities, resource lists and vocabulary development exercises. 85 pp.
T:U $0-5

1068. SHELLCRAFT CRITTERS, 1977, Alice Kellum; Great Outdoors Publishing Co., 4747 28th St., N., St. Petersburg, FL 33714.
Art; Activity. These short time projects for beginners use common, easily obtainable shells and simple materials. Two pages of pictures for shell identification. 32 pp.
S:P,U $0-5

1069. WATER-FRESH AND SALTY, 1982, Melanie Lewis; Dr. John Koran, SSTE, Norman Hall, Rm 353, College of Education, University of Florida, Gainesville, FL 32611.
Oceanography, Social Studies, Language Arts; Activity. Students are provided simple resources to learn geography on their own. They investigate properties of water including surface tension, density, salinity, temperature. Semi-programmed student materials and reinforcing activities are provided. 16 pp.
T,S:U,I $0-5

1070. THE LIVING SEA, Kathy Steen, et al., Springhill Middle School; Dr. John Koran, SSTE, Norman Hall, Rm. 353, College of Education, University of Florida, Gainesville, FL 32611.
Zoology; Unit, Text. Written information and illustrations on several marine animal groups: sponge, jellyfish, coral, worm, chordate and plankton. 10 pp.
S:U,I $0-5

1071. HOW ANIMALS TELL TIME, 1967, Millicent Selsam; William Morrow and Co., 105 Madison Ave., New York, NY 10016.
Zoology; Reading. One chapter of this book is a well-written narrative devoted to animals and tidal rhythms. This author has written many illustrated science books for children that are easy to read, accurate and always interesting. 94 pp.
S:U $5-10

1072. THE OCTOPUS AND OTHER CEPHALOPODS, 1977, Gladys Conklin; Holiday House, 18 E. 53rd St., New York, NY 10022.
Zoology; Reading. This interesting book is packed with information accompanied by black and white photos which provide a look at common but elusive marine animals. 63 pp.
S:U,I $5-10

1073. MICROSCOPIC ANIMALS AND PLANTS, 1974, Dorothy Patent; Holiday House, 18 E. 53rd St., New York, NY 10022.
Biology; Reference. A good resource for students to dip into, read through and return to again and again. it is also good for the teacher

who is in unfamiliar territory. Good black and white photos enhance directions for microscope use, slide preparation and keeping organisms alive in the classroom. 160 pp.
T,S:U,I $10-20

1074. THE BOOK OF SHELLS, 1965, Lula Siekman; Great Outdoors Publishing Co., 4747 29th St., N., St. Peterburg, FL 33714.
Zoology; Identification. Florida shells. Black and white drawings with accompanying text giving size, description, range and some habitat information along with nine color plates make this a useful guide. 80 pp.
T,S:U,I $0-5

1075. SEA TURTLE INFORMATION PACKET, 1981, Center for Environmental Education; Educational Materials, 1925 K St., NW., Suite 206, Washington, DC 20006.
Zoology, Multidisciplinary; Reference, Activity. Separate sheets in a portfolio that detail the seven species of sea turtle with added pages on threats to their survival along with suggested language, art and music activities. 26 pp.
T,S:U $0-5

1076. PELICAN, 1977, Ray Ovington; Great Outdoors Publishing Co., 4747 28th St., N., St. Petersburg, FL 33714.
Zoology; Reference. Packed with information on the life history of the brown pelican accompanied by charming drawings, this book is fascinating reading for the student and provides good infusion material for the teacher. 32 pp.
T,S:U $0-5

1077. MAN MEETS COAST-MAP-11, 1980, Diane Barile; Marine Advisory Program, Florida Cooperative Extension Service, 2001 McCarty Hall, University of Florida, Gainesville, FL 32611.
Multidisciplinary; Reading. Comic book format tells what a coastal zone is, what lives there, the resources, history of human dependence and impact. A list of agencies and organizations involved with coastal zone management is included. 57 pp.
T,S:U,I Free

1078. FROM SHORE TO OCEAN FLOOR, 1973, Seymour Simon; Franklin Watts, 730, 5th Ave., New York, NY 10019.
Ecology; Reference. An easy narrative style and flowing black and white illustrations make this book special. Chapters cover adaptation, food web, senses, camouflage, symbiosis, zonation and man's impact. 85 pp.
S:U,I $5-10

1079. KNOW YOUR UNDERWATER EXPLORATION, 1977, Neil Arelley; Rand McNally, Box 7600, Chicago, IL 60608.
Multidisciplinary; Reference. This soft cover, notebook size book has 22 short chapters ranging from submersibles to archaeology, mining and

sea serpents. Facts are delivered in easyreading style and are enhanced by many color photos and drawings. Good for reluctant readers in middle school. 49 pp.
S:U,I $0-5

1080. THE CHILDREN'S BOOK OF THE SEAS, 1976, Jenny Tyler, ed; Usborne/Hayes Books, 4235 S. Memorial Dr., Tulsa, OK 74145.
Oceanography; Text. This paperback, comic book in full color is crammed with information on geology, water movement, marine resources, exploration, and vocabulary development. This will pique a reluctant reader's interest. 32 pp.
S:U,I $0-5

1081. FOOD WEBS IN AN ESTUARY, Barbara Dunne; University of Maryland Sea Grant, H.J. Patterson Hall, Room 1222, College Park, MD 20742.
Ecology; Unit. Although written for Chesapeake Bay, this unit is directly usable in any classroom. Teachers' narrative gives good background information. Students' section is primarily activities of pencil and paper variety, plus two games and an experiment. This unit may be used for several class periods. 2[illegible] pp.
T,S:U,I $0-5

1082. USEFUL PLANTS OF THE SEA, Project COAST; 104 Willard Hall Ed. Bldg., University of Delaware, Newark, DE 19711.
Botany; Unit. Handouts, worksheet, and slides with script help students learn about algae. Reading list is included. May be used for one or two class periods.
S:U $0-5

1083. UNDERSTANDING ENVIRONMENT, Project COAST; 104 Willard Hall, Ed. Bldg., University of Delaware, Newark, DE 19711.
Social Studies, Language Arts; Unit. Students read four articles, and analyze the economic and aesthetic meanings of words used in various contexts. 2 or 3 class periods.
T,S:U,I $0-5

0184. THE BLUE CRAB, Project COAST; 104 Willard Hall, Ed. Bldg., University of Delaware Newark, DE 19711.
Zoology; Unit. The life and times of the blue crab and the crab fishing industry are presented through text, pre and post tests, handouts, teachers' guide, language arts activities and field trip suggestions. Two class periods.
T,S:U,I $0-5

1085. A CORAL REEF (Set Sp. 184), Society for Visual Education; 1345 Diversey Pkwy., Chicago, IL
Zoology; Unit. Package of eight large (13"x18") cards with color photo on one side and general text with vocabulary development on the reverse side. These are useful in independent study or for the reluctant reader. The series may be available from your central A-V library.
S:U,I $10-20

1086. SMALL ANIMALS OF SEA AND SHORE (Set Sp. 166), Society for Visual Education; 1345 Diversey Pkwy., Chicago, IL

Zoology; Unit. Package of eight large (13"x18") cards with a color photo on one side and general life history text along with research questions and enrichment activities on the reverse. These are useful for independent study, oral report props and general facts. "Large Sea Animals" series is also available. These may possibly be obtained through central A-V library.
S:U,I $10-20

1087. FOOD WEBS OF THE SEA, Weekly Reader Skills Books; 1250 Fairwood Ave., P.O. Box 16618, Columbus, OH 43216.
Ecology; Unit. This part of the science poster kit contains two spirit masters with exercises and puzzles keyed to a color poster depicting marine food webs. This can be easily used whenever the subject is food chains and food webs. The whole kit contains teachers guides and six posters each with spirit masters.
T,S:U $10-20

1088. BEHAVIOR-CURRICULUM PACKET, Sea World; 7007 Sea World Dr., Orlando, FL 32809.
Zoology; Unit. The behavior of marine mammals is explored using illustrated, fact-filled handouts for the students. Also included are teachers' background information, a lesson in animal training and a detailed discussion guide. 18 pp.
T,S:U,I $0-5

1089. ADAPTATION-CURRICULUM PACKET, Sea World; 7007 Sea World Dr., Orlando, FL 32809.
Zoology; Unit. Ditto masters, transparencies and background information for the teacher are used to teach marine animal adaptations for survival. The emphasis is on marine mammals. 19 pp.
T,S:U,I,H $0-5

1090. WHALES-CURRICULUM PACKET, Sea World; 7007 Sea World Dr., Orlando, FL 32809.
Zoology; Unit. Along with teacher's background information on whales and dolphins, there are handouts that compare these mammals with fish, diagrams of dolphins body parts and functions, and seven games. 35 pp.
T,S:P,U,I $0-5

1091. WHALES, 1980, National Coordinating Center for Curriculum Development, Ginn Gustom Publishing, 191 Spring St., Lexington, MA 02173.
Language Arts; Unit. Students compare objective and subjective writing in poetry and narratives while learning much valuable information about whales. 33 pp.
S:I,H $0-5

1092. ECOLOGY AND LIFE HISTORY OF THE FLORIDA MANATEE and BOATER'S GUIDE TO MANATEES, THE GENTLE GIANT, 1977, Florida Power and Light, 9250 W. Flagler, Miami, FL 33101.
Zoology; Reference. Become acquainted with Florida's own marine mammal. Two booklets with simple facts on the ecology and distribution of the manatee, its morphology, physiology, reproduction, location, migratory patterns. Bonus-How to Make a Sock Doll Manatee in

simple easy to follow steps. Ask FP&L for additional facts and activities. 18 pp. and 20 pp.
T,S:U,I,H Free

1093. BIOLOGY AND IDENTIFICATION OF RAYS IN THE CHESAPEAKE BAY (Ed. Series #23), 1978, Joseph Smith, J.V. Merriner; Virginia Institute of Marine Science, Gloucester Point, VA 23062.
Zoology; Identification Guide. This concise booklet includes a few pages of anatomy and biology followed by a simple key and descriptive paragraph with line drawing for each of ten common species of ray, all of which are found in Florida waters. 20 pp.
T,S:U,I,H,A $0-5

1094. THE MARINE TURTLES OF VIRGINIA (Ed. Series #24), 1979, John A. Musick; Virginia Institute of Marine Science, Gloucester Point, VA 23062.
Zoology; Identification Guide. Specific descriptions used in conjunction with good drawings and interesting notes on natural history and population status make this booklet appealing to a wide range of readers. 20 pp.
T,S:U,I,H,A $0-5

1095. MID-ATLANTIC MARINE ANIMALS THAT DEMAND YOUR RESPECT (Ed. Series #25), John Lucy; Virginia Institute of Marine Science, Gloucester Point, VA 23062.
Zoology; Reference. This booklet is not as comprehensive as Halstead's DANGEROUS MARINE ANIMALS . . . but not as expensive either. Good drawings of dangerous animals and/or their venomous body parts accompanied by descriptions of the animals, toxins and treatment make this a handy classroom addition.
T,S:U,I,H $0-5

1096. ONE HUNDRED FACTS YOU SHOULD KNOW ABOUT SHARKS, Milo Gerry; Florida 4-H Marine Program, Florida Cooperative Extension Service, Institute of Food and Agricultural Sciences, University of Florida, Gainesville, FL 32611.
Zoology; Reference. This is a good selection for the student fascinated by sharks and for the teacher to infuse "tidbits" into a unit on sharks. 16 pp.
T,S:I,H $0-5

1097. OCEANOGRAPHY MINI-CENTER, 1980. Engine-Uity Ltd., Publishers of Educational Materials, P.O. Box 9610, Phoenix AZ 85068.
Oceanography; Language Arts; Activity. This program is designed for gifted students. There are 12 color coded units (Mammals, Fish, Shells I & II, Birds, Geology and Instrumentation I & II, Microscope, Tide Pools, Ecology, Historical Ships and Modern Ships). Within each unit are six questions and directed activities which introduce Bloom's Taxonomy. Questions guide the student through knowledge, comprehension, application, analysis, synthesis and evaluation. Only one set per class is necessary.
S:U,I $0-5/each unit

OCEANOGRAPHY-PORTA CENTERS, 1980, Engine-Uity, Ltd., Publishers of Educational Materials, P.O. Box 9610, Phoenix, AZ 85068.
Oceanography; Language Arts; Activity. The following series of 20 separately numbered activities are designed for gifted students for use at home or in the classroom. Each unit has four 8-1/2 x 11" task cards coded to Bloom's Taxonomy which gives the student practice in areas of application, analysis, synthesis and evaluation. A student worksheet and teacher answer key are included. All units may be set up as a classroom display with no supplementary supplies necessary.
S:U,I $0-5/each unit

1098. WHALES - PCO:1

1099. SEALS - PCO:2

1100. DOLPHINS - PCO:3

1101. UNIVALVES - PCO:4

1102. BIVALVES - PCO:5

1103. STARFISH - PCO:6

1104. PELICANS - PCO:7

1105. PENGUINS - PCO:8

1106. INSTRUMENTS - PCO:9

1107. GEOLOGY - PCO:10

1108. WAVES, TIDES AND CURRENTS - PCO:11

1109. MICROSCOPES - PCO:12

1110. ALGAE - PCO:13

1111. PLANKTON - PCO:14

1112. OCTOPUSES - PCO:15

1113. CRUSTACEANS - PCO:16

1114. CORALS - PCO:17

1115. POLLUTION - PCO:18

1116. PRODUCTS FROM THE SEA - PCO:19

1117. ENDANGERED SPECIES - PCO:20

1118. MARINE ORGANISMS IN SCIENCE TEACHING - TAMU-SG-80-403, 1980, John Hunt; Sea Grant College Program, Texas A&M, College Station, TX 77843.

Zoology; Lab. This manual includes 42 labs comprised of pre and post lab directions for the teacher, student lab directions, concepts objectives, process skills, questions, answers, references and follow up. Pages are color coded and pre-punched for a three ring notebook. 196 pp.
T,S:U,I,H $0-5

1119. ANIMAL BEHAVIOR - MUD SNAIL RESPONSES, Project COAST; 104 Willard Hall, Ed. Bldg., University of Delaware, Newark, DE 19711.
Zoology; Language Arts, Lab. There are explicit directions for conducting this lab and a language arts supplement. The animals are readily obtained at low tide in an estuary; animals other than the mud snail could be substituted. 7 pp.
T,S:U,I $0-5

1120. HOW TO SET UP AND MAINTAIN A SALTWATER AQUARIUM, TAMU-SG-81-504, 1981, Russel Miget; Marine Information Service, Sea Grant College Program, Texas A&M, College Station, TX 77843.
Bioloty; Activity. No frills, cleverly illustrated, very easy to follow instructions for an almost foolproof, inexpensive aquarium.
S:U,I,H,A Free

1121. NORTH AMERICAN SEA LIFE, 1973, Mal Shyte, ed.; Troubador Press, 385 Fremont St., San Francisco, CA 94105.
Biology, Art; Activity. This coloring book has detailed drawings with a paragraph on natural history accompanying each picture. Completed pictures could be displayed in the classroom and the paragraphs used as references. 35 pp.
S:U $0-5

1122. SEA TURTLE COLORING BOOK, 1981, Francine Jacobs; Center for Environmental Education, Educational Materials, 1925 K. St., NW, Suite 206, Washington, DC 20006.
Zoology, Art; Activity. This bilingual (English-Spanish) booklet is teeming with sea turtle facts that complement seventeen intricate and artistic pictures to color. 34 pp.
S:P,U $0-5

1123. A DAY IN THE LIFE OF A MARINE BIOLOGIST, 1981, David Paige; Troll Associates, 320 Route 17, MahWah, NJ 07430.
Vo-Tech; Reference. Good color photos taken at the University of Miami support a descriptive text that highlights research and other appealing activities associated with the profession.
S:U $5-10

1124. HOW DID WE FIND OUT ABOUT LIFE IN THE DEEP SEA, 1982, Isaac Asimov; Walker Publishing Co., 720 5th Avenue, New York, NY 10019.
Oceanography, History; Reference. The author explains premise that led to the assumption that no life existed in the deep sea and goes on to tell about early attempts to discover the maximum depth of sea life. He explains how organisms live without sunlight and discusses some recent discoveries. Black and white illustrations complement the easy to read text. 61 pp.
S:U,I $10-20

1125. INTRODUCING UNDERWATER ARCHEOLOGY, 1976. Elisha Linder, Avner Raban; Lerner Publications, 241 First Avenue, N, Minneapolis, MN 55401.
Oceanography, History; Reference. The stories of the sunken city of Port Royal, Jamaica and other marine archeological discoveries are told with details of the tools, technology and scientific know'edge used to unravel undersea mysteries. Excellent color plates, black and white photos and line drawings along with a glossary of archaeological terms enhance the text.
S:U,I $5-10

1126. 101 BULLETIN BOARD IDEAS FOR SEAFOOD EDUCATION, 1981, Anita Webb; Extension Division, Virginia Polytechnic Institute and State University, Blacksburg, VA 24061.
Vo-Tech; Activity. These ideas coordinate with lessons in nutrition, consumer education, home economics, seafood harvesting and living marine resources. 105 pp.
T,S:U,I,H,A $5-10

1127. SEAFOOD PRODUCTS: INSTRUCTIONAL GUIDE FOR HOME ECONOMICS PROGRAMS, 1981, Anita Webb, et al; Extension Division, Virginia Polytechnic Institute and State University, Blacksburg, VA 24061.
Vo-Tech; Unit. These loose-leaf, self-contained lesson plans and mini courses emphasize nutrition and consumer education. There are three levels of complexity on color coded pages. Each lesson contains concepts, objectives, evaluations and teacher directions. Supplementary activities, transparency masters and references are also included.
T,S:U,I $5-10

1128. OBIS-SEASHORE MODULE, 1981, Delta Education, Box M, Nashua, NH 03061.
Zoology; Field. This series of six field activities uses simple, inexpensively made equipment. Each activity includes background information, materials list, preparation, procedure, discussion questions, follow-up activities and action cards. Concepts developed are animal behavior, adaptation, behavior and organism transport. The material is well presented packed in a sturdy plastic envelope with pretty cover photos, good diagrams.
T,S,:U,I $0-5/activity

1129. A HANDBOOK FOR FIELD TRIPS IN MARINE BIOLOGY, 1967, John D. Woolever and Quida L. Verizzo; Dr. John Koran, SSTE, Norman Hall, Room 353, College of Education, University of Florida, Gainesville, FL 32611.
Biology; Field. This booklet directs the study to "look and learn" at the shore. It provides illustrations and information on plants and animals typically found along Florida's coastline. A student checklist is provided. 55 pp.
T,S:U $0-5

1130. WHY IS A BEACH A BEACH: SEVENTH GRADE, Lee County Environmental Education Center, 2055 Central Avenue, Ft. Myers, FL 33901. Oceanography; Field. This semi-programmed booklet directs student observation and understanding of how a beach is formed. Drawings and descriptions of common beach plants along with follow-up classroom materials are included. 15 pp.
S:U,I $0-5

1131. WHO'S WHO ON THE BEACH: SIXTH GRADE, Lee County Environmental Education Center, 2055 Central Avenue, Ft. Myers, FL 33901. Zoology; Field. This semi-programmed booklet is for student use at the beach. It directs student observation and teaches food webs and trophic levels. Drawings and descriptions of common beach organisms supplement the activities. 32 pp.
S:U,I $0-5

Entries 1132-1134 comprise units built around field trips with personnel trained in field work. These materials have been available with Title IV-C Adopter Grants and several Florida districts have adopted them. All of these units have a printed booklet for the teacher which includes instructions, copies of all student materials, scripts for slide shows and directions for classroom activities. All give a brief list of what will be done in the field and copies of tests with answer sheets. The booklets themselves are low cost but classroom preparation is not adequate without the slides and other materials. These units are very good if done with adequate field time with a trained and equipped teacher. Order from: Martin County Environmental Studies Center, 2900 NE Indian River Drive, Jensen Beach, FL 33457.

1132. MANGROVE COMMUNITIES: FOURTH GRADE, 1976.
Ecology; Unit, Field. A self-contained unit for the study of mangrove communities and food chains which contains teacher background information, student booklets, activities, test, data sheets for field trips, and outline of field trip studies. Vocabulary development slide show is not essential to the unit. 5-10 class periods.
T,S:U $5-10/unit
$10-20/slide show

1133. ECOSYSTEMS: FIFTH GRADE.
Ecology; Field. Preparation for field work in mangroves and grassflats via slide tape shows and student booklets on ecosystems and food webs. There are student activities for vocabulary development, tests and field data sheets. Scripts for the slide shows and directions for a food web card game are included. 5 class periods, 2 day field trips.
T,S:U $5-10/unit
$10-20/slide show

1134. RIVER INVESTIGATION: SIXTH GRADE
Oceanography; Field. Self-contained unit on a tidal river system and some of the problems that man has caused. Included are background information for the teacher, student booklets, activities, test, slide show scripts, and field data sheet. The slides are excellent and greatly enhance this unit. 5-10 class periods.
T,S:U,I $10-20

1135. NEWFOUND HARBOR MARINE INSTITUTE EDUCATOR'S GUIDE, 1982, Deborah Coulombe, Newfound Harbor Marine Institute, Rt. 3, Box 170, Big Pine Key, FL 33043.
Zoology, Ecology; Field, Reference. Background information and identification of organisms typical of Florida Keys communities. Extensive vocabulary.
T,S:I,H $0-5

RESOURCE GUIDE FOR FIELD STUDIES, P.K. Yonge Laboratory School, College of Education, University of Florida, Gainesville, FL 32611.
Geology; Field, Reference. Entries 1136-1139 comprise a series of monographs that present case studies and resource guides for sites characteristic of four geological areas in Florida. Case studies give methods of planning a field trip, its activities and objectives, pre-and post-trip activities, and evaluation. Each document includes road directions to study site, maps, photographs, and discussion of educational purposes, age levels, teaching, units, and activities to which the site is adapted. Also included are safety factors and hours available to visit the site.
T:U,I,H $0-5

1136. THE DEVILS MILLHOPPER, A RESOURCE FOR DEVELOPING FIELD STUDIES, 1973.

1137. LITTLE TALBOT ISLAND, A RESOURCE FOR DEVELOPING FIELD STUDIES, 1973.

1138. ST. AUGUSTINE TO FLAGLER BEACH, A RESOURCE GUIDE FOR FIELD STUDY.

1139. CEDAR KEYS AREA ON FLORIDA'S GOLD COAST, A RESOURCE GUIDE FOR FIELD STUDY, 1974.

1140. A BEACH AND DUNE COMMUNITY, 1980, Mac Rawson; Alabama Cooperative Extension Service, Mobile, AL.
Ecology; Text. Background information with pictorial representation of beach community familiarizes students with organisms they will see in the field. 8 pp.
S:U,I $0-5

1141. BUILDING A DUNE, 1980, Mac Rawson; Alabama Cooperative Extension Service, Mobile, AL.
Oceanography; Text, Field. Background information on dune formation and stabilization complement discussion of artificial stabilization techniques and instructions on planting beach grasses.
S:U,I $0-5

1142. DO YOU BELIEVE IN GHOST CRABS? Project COAST; 104 Willard Hall Ed. Bldg., University of Delaware, Newark, DE 19711.
Zoology; Field. Preparation, directed field study and classroom follow-up encourages the student to make inferences from observations. Review questions, suggested creative activities and slides are included. 2 or more class periods.
T,S:U,I $0-5

1143. NAVIGATION, 1982, Project CAPE, Dare County Board of Education, P.O. Box 640, Manteo, NC 27954.
Multidisciplinary; Unit. This contains text, activities, games equipment, construction. History of ocean crossing including study of early seamen's lives, lessons in navigation, ship communication and astronomy. Each section has objectives, skills, materials, vocabulary, references and student handouts. Several class periods.
T,S:U,I $0-5

1144. GEOMETRICS B (MATH CLUES), 1980, Brenden Kelly; EDC, 4235 S. Memorial Drive, Tulsa, OK 74135.
Math; Activity. Geometry workbook with cartoon illustrations of fish and scuba divers. The exercises combine fun with progressive self-instruction. 32 pp.
S:U,I $0-5

1145. THE ART AND INDUSTRY OF SANDCASTLES, 1971, Jan Adkins; Walker Publishing Co., 720 5th Avenue, New York, NY 10019.
History, Math; Activity. This delightfully written and illustrated book provides a history of castles, their structure and layout, a look at the reasons for being and the people who built and inhabited them. Throughout the book are techniques for building these castles in sand; in fact, many of the illustrations are of sandcastles. A wonderful learning experience for students from 9 to 99. See entry 1146 for math unit developed around this book. 30 pp.
T,S,:U,I,H,A $5-10

1146. MATH OUT-OF-DOORS, SANDCASTLES, 1982, Clara Durant, et al; Martin County Environmental Studies Center, 205 Indian River Dr. S., Jensen Beach, FL 33457.
Math; Unit. Developed to give students practice in measurements, geometrics and scale drawings. It leads the student through processes required to develop accurate plans on paper for building a sandcastle, scaling up the plans and actually building it. Teacher's guide, glossary and test are included. See entry 1145 for book around which this unit was developed. 23 pp.
T,S:U,I $0-5

1147. FROM SAIL POWER TO NUCLEAR POWER: AMERICA'S HERITAGE AND ENERGY EDUCATION: VOLUMES I & II, William Heitzmann; Con-Stran Publications, 3600 Conshohocken Avenue, Suite 2108, Philadelphia, PA 19131.
Vo-Tech, History; Activity. Designed for the unmotivated student, these workbooks contain simple activities that require no outside materials or teacher preparation. Black and white photos and an annotated bibliography of instructional resources are included. 31 & 33 pp.
S:U,I,H $0-5 each

1148. COASTAL LIVELIHOODS AND CRAFTS, 1982, Project CAPE; Dare County Board of Education, P.O. Box 640, Manteo, NC 27954.
Multidisciplinary, Vo-tech; Unit. Using text, activities and games, students will learn about marine related jobs and some crafts associated

with the sea. Each of 12 sections has objectives, skills list, materials, vocabulary, references and student handouts.
T,S:U,I $0-5

1149. THE CRAFT OF SAIL, 1973. Jan Adkins; Walker and Co., 720 5th Avenue, New York, NY 10019.
Language Arts; Social Studies; Reference. Starting with a touch of history and physics, this marvelous book takes the student through the techniques of sailing, types of boats, navigation, and all the sailors' basic skills. The writing and illustrations complement each other, are very clear and have a lot of "body." See entry 1054 for booklet with activities to supplement this book. 64 pp.
T,S:I,H,A $10-20

1150. THE FIRST SHIPS AROUND THE WORLD, 1977, W. D. Brownlee; Lerner Publications, 241 1st Avenue, N, Minneapolis, MN 55401.
History; Reference. Written by a master mariner about conditions aboard ship in the 15-16th centuries, this fascinating book includes navigation, design and daily life, and death while sailing around the world. Superb line drawings complement the text. 51 pp.
T,S:U,I $5-10

1151. PIRATES AND PRIVATEERS, 1980, Edith McCall; Childrens Press, 1224 W. VanBuren St., Chicago, IL 60607.
History; Reference. Dramatization of the adventures of such legendary pirates and buccaneers as Stede Bonnet, Peter Francis, Blackbeard and Silas Talbot in simple, uncluttered text and imaginative drawings. 130 pp.
S:U,I $5-10

1152. THE SHIP AND SEA IN ART, 1969, Margaret Gracza; Lerner Publications, 241 1st Avenue, N, Minneapolis, MN 55401.
Art; Reference. Each page has a monochromatic reproduction of a classic work of art accompanied by a discussion of the artist, school, and sensitive explanation of the technique, medium, mood, use of color, etc. 64 pp.
S:U,I $5-10

LITERATURE, TALES OF THE SEA-PORTA CENTERS, 1980, Engine-Uity Ltd., Publishers of Educational Materials, P.O. Box 9610, Phoenix, AZ 85068.
Language Arts; Activity. The following series of ten separately numbered activities are designed for gifted students and coded to Bloom's Taxonomy. They are easy to make for classroom display and convenient to store. The purpose is to expose the student to controlled open-ended research. Each of the ten topics includes readings, worksheet questions and task cards to encourage projects and research in application, analysis, synthesis and evaluation. Copies of the books around which these activities are developed are necessary for classroom use.
S:U,I $0-5/each activity

1153. ISLAND OF THE BLUE DOLPHINS-PCL:1 (Scott O'Dell)

1154. CALL IT COURAGE-PCL:2 (Armstrong Sperry)

1155. CARRY ON, MR. BOWDITCH-PCL:3 (Jean Latham)

1156. 20,000 LEAGUES UNDER THE SEA-PCL:4 (Jules Verne)

1157. KON TIKI-PCL:5 (Thor Hyerdahl)

1158. MOBY DICK-PCL:6 (Herman Melville)

1159. MUTINY ON THE BOUNTY-PCL:7 (Charles Nordhoff)

1160. AFRICAN QUEEN-PCL:8 (C.S., Forester)

1161. CAINE MUTINY-PCL:9 (Herman Wouk)

1162. TYPHOON-PCL:10 (Joseph Conrad)

1163. ISLAND OF THE BLUE DOLPHINS, 1960, Scott O'Dell; Dell Publishing Co., 1 Dag Hammarskjold Plaza, New York, NY 10017.
Language Arts; Reading. Story of a young girl's survival on a tropical island using primitive tools and knowledge acquired before her family was lost. Good descriptions of food gathering and preparation techniques, tool making and hunting practices of an island culture prior to 1900. See entries 1054 and 1153 for supplementary activities. 184 pp.
S:I $0-5

1164. CALL IT COURAGE, 1971, Armstrong Sperry, MacMillan Publishing Co., 866 3rd Avenue, New York, NY 10022.
Language Arts; Reading. Story of a Polynesian boy who overcomes his fear of the sea by embarking on a dangerous solo voyage. See entry 1154 for supplementary activities. 116 pp.
S:I $0-5

1165. CARRY ON MR. BOWDITCH, 1955, Jean Latham; Houghton Mifflin, Co., 1 Beacon St., Boston, MA 01803.
Language Arts; Reading. Biographical story of the noted mathematician, navigator and author whose life spanned the Revolutionary War and who wrote the definitive book on navigation. This easy and fun reading lends insight into seafaring, ships, and trade of that time. See entry 1155 for supplementary activities. 251 pp.
T,S:I,H $0-5

1166. 20,000 LEAGUES UNDER THE SEA, 1966, Jules Verne; Pocket Books, Inc., 1230 Avenue of the Americas, New York, NY 10020.
Language Arts; Reading. The most fantastic voyage ever undertaken to the wonder-world of the ocean's floor. A classic. 389 pp.
S:U,I $0-5

1167. KON TIKI, 1950, Thor Heyerdahl; Pocket Books, Inc., 1230 Avenue of the Americas, New York, NY 10020.
Language Arts; Reading. A biologist duplicates the legendary voyage of mythical Polynesian hero, Kon-Tiki, who migrated to the islands from the East. This is a sea story of excitement and suspense in a balsa log raft. See entry 1157 for supplementary activities.
S:U,I $0-5

1168. MOBY DICK, 1982, Herman Melville; Bantam Books, 666 5th Ave., New York, NY, 10019.
Language Arts; Social Studies; Reading. This classic story conveys whalers life in sailing days. It is rich in detail, descriptions and has excellent vocabulary development. See Entry 1158 for supplementary activities.
T,S:I,H,A $0-5

1169. CAINE MUTINY, 1951, Herman Wouk; Pocket Books, Inc., 1230 Avenue of the Americas, New York, NY 10020.
Language Arts; Reading. Pulitzer Prize novel of the U.S. Navy in World War II. Part of an American folk legend, it is the story of mutiny, court-martial and mortal fear. See entry 1161 for supplementary activities. 639 pp.
T,S:I,H,A $0-5

1170. THE CAY, 1969, Theodore Taylor; Doubleday, 245 Park Ave., New York, NY 10017.
Language Arts; Reading. Marooned on a desert island after his boat was torpedoed, young Phillip, injured and blind was befriended by Timothy, the huge, old, West Indian native. This award winning story of their struggle for survival and their loving friendship is good reading. See entry 1054 for supplementary activities. 137 pp.
S:I $5-10

1171. THE GOLDEN DRAGON, BY CLIPPER SHIP AROUND THE HORN, 1978, John Loeper; Scribner's, One Vreeland Ave., Totowa, NJ 07512.
Language Arts, History; Reading. The story of a ten-year old boy's voyage around Cape Horn by clipper ship in 1850 gives insight into the life style of the period as well as the routine of shipboard life. A typical ship's manifest and diagram of a clipper ship are included.
S:U,I $5-10

1172. THE SEA EGG, 1967, L. M. Boston; Harcourt, Brace and World, 757 3rd Ave., New York, NY 10017.
Language Arts; Reading. This fanciful story about two boys who acquire a sea egg from which a "triton" (merman) hatches, teaches a great deal about tides, waves, rocky shores, fishing and caring for the sea. 94 pp.
S:U,I $10-20

1173. MINI-LEARNING CENTERS, SET I: LANGUAGE ARTS, TAMU-SG-81-401, 1981, Sea Grant College Program, Texas A&M, College station, TX 77843.
Language Arts; Activity. Five sturdy plastic coated folders designed for repeated use. These mini-centers encourage students to work independently and inspire teachers to develop additional centers in subject areas in which students need extra help.
S:U $5-10

1174. THE EYES OF THE AMARYLLIS, 1977, Natalie Babbit; Farnar Straus and Girous, 19 Union Square, W., New York, NY 10003.
Language Arts; Reading. Story about a deadly game with the sea that only the sea knows how to win. 128 pp.
S:U,! $5-10

SECONDARY GRADES, JUNIOR HIGH-HIGH SCHOOL

Secondary Teachers Please Note:

Look through upper and middle section (entries 1062-1178) also. There are many broad spectrum materials entered there that may be just what you want for your junior high or high school students.

2000. COASTAL AWARENESS: A RESOURCE GUIDE FOR TEACHERS OF JUNIOR HIGH SCIENCE, 1978, Frederick Rasmussen; Office of Coastal Zone Management, NOAA, 3300 Whitehaven St., NW, Washington, DC 20235.
Oceanography; Reference. A resource guide for teachers of junior high science. Although the text is identical to the high school resource guide (entry 2111), field and classroom activities and extensive multi-disciplinary reading list are tailored to the junior high school class.
T:I Free

2001. PATHWAYS IN SCIENCE: EXPLORING THE EARTH, SEA AND SKY, 1975, Joseph Oxenhorn; Globe Book, Co., 50 W 23rd St., New York, NY 10010.
Oceanography; Textbook. Four units in this text are directly suited to marine education and parts of others can be used. This book supersedes the paperback, OCEANOGRAPHY, in the Pathways series. It has color pictures and charts, vocabulary development, labs, study questions, teacher's guide with answers; lab materials list, references, and directions on how to do everything to teach a science. 548 pp.
T,S:U,I $10-20

2002. OCEANOGRAPHY AND OUR FUTURE, 1975, Joseph Oxenhorn, Burton Foldfield; Globe Books, Co., 50 W 23rd St., New York, NY 10010.
Oceanography; Textbook. This paperback with teacher's guide, covers four general topics: oceans of the world, the marine environment, life in the sea and the use and misuse of the oceans. Chapters are short with multiple subheadings, many colorful photos and diagrams, mid-chapter summaries. Chapter review questions, and simple classroom and field project ideas. This text can be used in a nine-week course for middle school reluctant readers. 184 pp.
S:U,I $5-10

2003. OCEANS/SPACE: TEACHERS EDITION, 1976, George Katagiri et al; Silver Burdett, 250 James St., Morristown, NJ 07960.
Oceanography; Activity. Self-paced investigations for elementary science. This teacher's edition includes student book which has very

simple written text, skills and activities richly illustrated with cartoon figures to help poor readers, students' record and investigation books, process skills, objectives, instructions to the study, and answer keys. See entry 2004. 175 pp.
T;U,I $10-20

2004. OCEANS/SPACE: STUDENT'S MODULE, 1976, George Katagiri et al; Silver Burdett, 250 James St., Morristown, NJ 07960.
Oceanography; Textbook. Self-paced investigations for elementary science. Student reads the material, masters the skill, and does the activity on his own. The text is very simply written with brief instruction supplemented with profuse cartoon illustrations to clarify instructions for poor readers. An investigations and record book are included. See entry 2003. 72 pp.
T:U,I $5-10

2005. EARTH/WEATHER, 1976, George Katagiri et al; Silver Burdett, 250 James St., Morristown, NJ 07960.
Oceanography; Textbook. Self-paced investigations for elementary science. Student reads the material, masters the skill, and does the activity on his own. The text is simply written with brief instructions supplemented with cartoons that clarify instructions for poor readers. Student investigations and record books are included. Teacher's edition available. This book ties into oceanography with one chapter on marine sediments. 175 pp.
S:U,I $10-20

2006. OCEANS, 1980, Mary Storin; Xerox Education Publications, P.O. Box 2639, Columbus, OH 43216.
Oceanography; Text. Excellent short course in oceanography. There are questions at the end of each chapter and a teacher's guide is available. Subjects included are: motion, chemistry, resources, ocean floor, submarine and law. 63 pp.
S:I,H $0-5

2007. OCEANOGRAPHY, 1981, Boy Scouts of America, Merit Badge Series, Irving, TX.
Oceanography; Activity. Short text with inexpensive, somewhat challenging projects to build such as wave generator, volcano and beach profile models and plankton net. Activities include oceanography reporting, water testing and record keeping. Vocabulary and bibliography. 48 pp.
S:I,H $0-5

2008. EARTH SCIENCE, 1982, F. Brown, G. Kemar; Silver Burdett, 250 James St., Morristown, NJ 07960.
Oceanography; Textbook. Teacher's edition. This is a well-written and beautifully illustrated book. Each chapter has summary vocabulary, at the end of each unit are review questions plus careers and research information. Teacher's edition has, in the margins, answers to all questions, science background information, objectives, strategies, vocabulary, concepts and extension activities. 503 pp.
T:I $10-20

2009. OCEANOGRAPHY, A STUDY OF INNER SPACE, 1965, Warren E. Yasso. Holt, Rinehart and Winston, 383 Madison Ave., New York, NY 10017.
Oceanography; Textbook. This is a good text for a nine-week survey course. It is easy reading with black and white illustrations and includes a glossary and bibliography. 180 pp.
T,S:I $10-20

2010. TODAY'S WEATHER, Dr. Wayne Schade; 6100 Guadalupe St., Austin, TX 78752.
Oceanography; Unit. This three week mini-course for earth science includes simple projects and activities from constructing weather instrument and observing conditions to making reports and station models. Easy construction directions, objectives, and question for each of four core and two excursion activities are included. Supplementary reference and text material are necessary.
S:I Free

2011. HAVE YOU BEEN TO THE SHORE BEFORE, 1980, John Butzow; NNEMEP, 206 Shibles Hall, University of Maine, Orono, ME 04469.
Ecology; Unit. This marine education infusion unit includes multi-disciplinary field and classroom skill building activities and background information on seashore habitats. Requires some adaptation for use in Florida. 45 pp.
T,S:I $0-5

2012. IS OUR FOOD FUTURE IN THE SEA, 1981, John Butzow; NNEMEP, 206 Shibles Hall, University of Maine, Orono, ME 04469.
Vo-Tech, Social Studies; Unit. This marine education infusion unit includes a text on aquaculture of shellfish, finfish and algae and details many of the special problems that arise in aquaculture. Also included is a lab on mussel dissection and a lab on crustacean behavior. Activities simulate original thinking on solving aquaculture problems. 38 pp.
T,S:I,H $0-5

2013. 4-H MARINE PROGRAM, Sea Grant, North Carolina State University, 105 911 Bldg., Raleigh, NC 27650.
Multidisciplinary; Activity. A potpourri of activities, games, information, field guides, sea food recipes, and songs. Three units can be developed from the activities: seafood, seashore food webs and building and maintaining a marine aquarium.
T,S:U,I $0-5

2014. MARINE ECOLOGY RESEARCH PROJECT, 1977, Deborah Shenfill; Instructional Media Services Dept., County Supt. of Schools Office, Alameda County, Haywood, CA 94511.
Ecology; Text. Ten self-contained units with text, activities, vocabulary, review questions, and simple experiments. There are many additional activities, resource lists and bibliography. This is useful as an infusion unit or it can be used alone. Needs no adaptation for use in Florida. 266 pp.
T,S:I $5-10

2015. INTRODUCTION TO MARINE ENVIRONMENTS, 1978, Robert Zottoli; C.V. Mosby Company, 1183 Westline Industrial Dr., St. Louis, MO 63141.
Ecology; Text. The physical, chemical and geological factors in the marine realm are presented as a preface to the study of shore habitats and their organisms, including beaches, estuaries, and rocky intertidal zones. This book works well with a 6-9 week infusion unit. 252 pp.
T,S:I,H $5-10

2016. MAN AND THE GULF OF MEXICO, 1980, Lloyd E. Story; Coordinator, Information and Publications, Mississippi-Alabama Sea Grant Consortium, Caylor Building, Ocean Springs, MS 39564.
Social Studies, Ecology; Unit. This is comprised of six units developed by teachers, science educators and professors. They are intended to provide supplemental infusion materials. Each unit is comprised of a series of concepts with objectives, background material, vocabulary and activities. Volumes I-IV cover ecology, habitats, animal diversity and plant diversity. Units V and VI will be published in 1983.
T:H $5-10

2017. MARINE SCIENCE, 1978, Kent Sprecher; Lee County Board of Public Instruction, 2055 Central Ave., Ft. Myers, FL 33901.
Biology; Textbook. Although this is a survey course of physical, chemical, geological and biological marine science, the emphasis is on biology. There are nine illustrated units which include questions. A tenth unit has instructions on collection, identification and preservation of organisms. In order to use the material for a semester course supplementary research, field, lab or lecture must be added. It can also be used as an infusion unit. This is a good text choice for an inexpensive classroom set. 110 pp.
T,S:I,H $0-5

Entries 2018-2020 are written by L. Mauldin, D. Frankenberg. They may be ordered from: UNC Sea Grant, P.O. Box 5001, North Carolina State Univesity, Raleigh, NC 27650.
Multidisciplinary; Unit. These separate units cover environmental aspects of the coast including geology, ecology and seawater interactions and motions. Additional units cover facets of coastal communities and economics, history, anthropology, art, folklore and literature. Each unit is divided into concepts, each of which contains background reading, vocabulary, several innovative activities, and suggested further reading.
T,S:U,I $0-5/Unit

2018. COASTAL GEOLOGY: UNIT ONE, NORTH CAROLINA MARINE EDUCATION MANUAL, UNC-SG-7814-A.

2019. SEAWATER: UNIT TWO, NORTH CAROLINA EDUCATION MANUAL, UNC-SG-78-14-B.

2020. COASTAL ECOLOGY: UNIT THREE, NORTH CAROLINA MARINE EDUCATION MANUAL, UNC-SG-78-14-C.

2021. A COURSE IN PHYSICAL OCEANOGRAPHY FOR NINTH GRADE, Jeff Hallett; Duval County Marine Center, 1347 Palmer St., Mayport, FL 32233.
Physics; Unit. This two-week, mini course includes waves, tides, currents, sedimentation, navigation and man's role. Supplementary readings, film strips and field trips are available. 36 pp.
T,S:I $0-5

2022. A STUDY OF SEA LIFE, Patricia Kirkland, Marilyn Heaney; Duval County Marine Center, 1347 Palmer St., Mayport, FL 32233.
Ecology; Unit. Two-week study of habitats (marshes and estuaries) populations, scientific drawing and taxonomy includes field exercises and vocabulary. Although designed for Duval County, it is easily adaptable elsewhere. 55 pp.
T,S:I,H $0-5

2023. TRANSPARENCY MASTERS, A STUDY OF SEA LIFE, Patricia Kirkland, Marilyn Heaney; Duval County Marine Center, 1347 Palmer St., Mayport, FL 32233.
Ecology; Reference. This series of visual aids includes zonation nutrients, light, organisms, and taxonomy. They stand alone or can be used with sea life unit (entry 2022). 34 pp.
T,S:U,I $0-5

2024. MARINE BIOLOGY, Patricia Carothers, Gary Kirkland; Duval County Marine Center, 1347 Palmer St., Mayport, FL 32233.
Biology; Unit. This two-week survey of habitats, organisms, ecology and fish anatomy includes collecting techniques, microscope use, identification of planktonic and estuarine organisms, adaptation, importance of estuaries, and effects of pollution. Field studies are designed for Duval County but are adaptable elsewhere. 40 pp.
T,S:I,H $0-5

2025. TRANSPARENCY MASTERS, MARINE BIOLOGY, Patricia Caorthers, Marilyn Heaney; Duval County Marine Center, 1347 Palmer St., Mayport, FL 32233.
Biology; Reference. This series of visual aids includes fishery equipment, fish anatomy, food web, plankton, zonation, habitats and taxonomy. They stand alone or can be used with the marine biology unit (entry 2024). 24 pp.
T,S:I,H $0-5

2026. A TEACHER'S GUIDE TO BIOLOGICAL MINI-COURSES, MODERN MAN AND THE SEA, David Gibson et al; Lee County Board of Public Instruction, 2055 Central Ave., Ft. Myers, FL 33901.
Oceanography, Vo-tech; Activity. Teacher's guide which lists resources, including text, speakers, field trips, and project ideas, for use in the development of units on marine occupations. There are directions for 12 simple activities which deal with marine organisms, tides, current, sea water composition, and man and the sea. 40 pp.
T,S:I,H $0-5

2027. LIFE IN THE SEA, Florida Cooperative Extension Service, Institute of Food and Agricultural Services, University of Florida, Gainesville, FL 32611.
Biology; Text. Three separate booklets that contain information on 1) mammals, penguins, tide pools, reefs; 2) student questions, activities and 3) answers to questions in booklet two. Easily used as infusion units. 47 pp.
T,S:I,H $0-5

The following ORCA units (entries 2028-2030 and 2091) can be used in progression or used independently. They have a large variety of activities each of which includes objectives, teacher preparation, materials, procedures, assignments, extended activities and bibliography. These units are easy to use and all necessary materials are included.

2028. BEACHES, 1979, Andrea Marrett; ORCA, Pacific Science Center, 200 2nd Ave., N. Seattle, WA 98109.
Oceanography, Social Studies; Unit. A ten-day unit comprised of four activities which introduce the student to physical and biological processes of the beach zone including the habitat concept, physical configuration, forces that form and shape beaches, and impact of human use.
S:I $5-10

2029. BEACH PROFILES AND TRANSECTS, 1979, Claire Jones; ORCA Pacific Science Center, 200 2nd Ave., N. Seattle, WA 98109.
Physics, Math; Unit. This seven-to-nine-day unit is comprised of eight activities which teach measurement and recording profile of a slope, use of a single line transect-quadrat method to sample populations. This is designed to follow "Beaches" unit (entry 2028).
S:I $5-10

2030. TIDES, 1979, Andrea Marrett; ORCA, Pacific Science Center, 200 2nd Ave. N, Seattle, WA 98109.
Oceanography; Unit. A six-day introduction to the nature of tides with three activities that teach the relationship of tides to the position of sun, moon and earth, how to read tide charts and how to make predictions. 58 pp.
S:I $5-10

2031. WETLANDS, 4-H PROJECT MANUAL AND RECORD, 1980, Florida Cooperative Extension Service, Institute of Food and Agricultural Sciences, University of Florida, Gainesville, FL 32611.
Ecology; Text. Information on estuaries, salt marshes and mangrove swamps is enhanced by good drawings and photos. The accompanying booklet has paper and pencil enrichment activities, field activities and study questions.
T,S:I,H $0-5

2032. FLORIDA 4-H MARINE SCIENCE PROGRAM MEMBERS GUIDE, 1979, Florida Cooperative Extension Service, Institute of Food and Agricultural Services, University of Florida, Gainesville, FL 32611.
Zoology; Text. Background information on several marine organism groups is accompanied by good illustrations. Each chapter has a pencil

and paper activity. There are two chapters on sand and beaches. This readily lends itself to use as infusion material. 49 pp.
T,S:I,H $0-5

2033. MANGROVES BUILD LAND, James Frank; Lee County Board of Public Instruction, 2055 Central Ave., Ft. Myers, FL 33901.
Ecology; Unit. Background information for student reading or teaching lecture plus instructions for building a mangrove model to study the plant's stabilizing characteristics and a pre and post test make this a handy infusion unit.
T,S:I $0-5

2034. MANGROVES AND SEAWALLS, James Frank; Lee County Board of Public Instruction, 2055 Central Ave., Ft. Myers, FL 33901.
Ecology; Unit. Background information, handouts for exercises and pre and post tests are provided in this short (1-2 class period) unit. 20 pp.
T,S:U,I $0-5

2035. DO YOU KNOW YOUR MARINE FISH, 1982, John Butzow, NNEMEP, 206 Shibles Hall, University of Maine, Orono, ME 04469.
Multidisciplinary; Unit. Information is provided on anatomy, physiology and life histories of many fish. The student is taught how to observe fish and their behavior, and how to use a dichotomous key. Sections are included on fishing techniques and sea food preparation along with art and literature activities, transparency masters, a game, simple labs and suggested field work. 50 pp.
T,S:I $0-5

2036. FINS AND SCALES: 4-H MEMBERS PROJECT MANUAL, 1979, Florida Cooperative Extension Service, Institute of Food and Agricultural Sciences, University of Florida, Gainesville, FL 32611.
Zoology; Unit. A study of fin and tail shapes, structure and function help prepare the student for observation and field identification. A second study deals with fish scale shape, structure, and growth rings. Appropriate activities are suggested. 11 pp.
T,S:I,H $0-5

2037. AQUATIC SCIENCE-MARINE FISHERIES BIOLOGY: TAMU-SG-79-405, James Davis and Deborah Lightfoot; Sea Grant College Program, Texas Agricultural Extension Service, Texas A&M, College Station, TX 77843.
Zoology, Vo-tech; Text, Activity. This booklet covers shorelines, including water movement and organisms, fish, and shellfish identification, life history and management. The activities are good for the motivated student. 18 pp.
S:I,H $0-5

2038. TOOLS OF OCEANOGRAPHY, ORCA; Pacific Science Center, 200 2nd Ave. N., Seattle, WA 98109.
Oceanography, Social Studies; Unit. Beginning with early navigation equipment, the student learns about various sampling and exploring

equipment and how to make simple instruments for use on a field trip. This unit includes readings, directions, transparency masters, and tests. No slides.
T,S:I $5-10

Entries 2039-2051 may be ordered from Project COAST; 104 Willard Hall Ed. Bldg., University of Delaware, Newark, DE 19711.

2039. THE NOISY DEEP
Physics; Unit. Using a journal article to pique interest, sound transmission is explained by means of simple experiments. Vocabulary development and suggested research are included. 1-2 class periods.
T,S:U,I,H $0-5

2040. THE MOON, THE SUN AND TIDES.
Physics, Unit. Teacher's guide, handouts, pre and post tests, and activities lead the student in observing how tides are caused and teaches him how to make tidal predictions. 3-4 class periods.
T,S:I,H $0-5

2041. WHAT IS PHYSICAL OCEANOGRAPHY
Physics; Unit. A condensed overview of subject areas encompassed in physical oceanography is provided along with activities and tests. Two or more class periods.
T,S:I,H $0-5

2042. WATER DENSITY AND OCEAN CURRENTS.
Physics; Unit. Text, handout, tests and four simple experiments convey the effect of water density on ocean currents. One class period.
S:I $0-5

2043. DISSOLVED OXYGEN MEASURED QUALITATIVELY.
Chemistry; Unit. Semi-programmed materials, tests and a simple experiment teach the student the value of dissolved oxygen to aquatic life. Student analyzes given data and draws conclusions. 4-5 class periods.
T,S:I,H $0-5

2044. AIR AND LIFE.
Chemistry; Unit. Using inquiry and experiments, this unit teaches the origin of atmospheric gases, their biological utilization, and the interaction of atmosphere and ocean. Several class periods.
T,S:I,H $0-5

2045. EFFECTS OF DDT ON OSPREY REPRODUCTION.
Zoology; Unit. Transparency masters, script and inquiry cover this special subject. Related topics for discussion or research are suggested. One class period.
T,S:I,H $0-5

2046. MARSHES, NATURE'S BOUNTY.
Ecology; Unit. Scripted slide show and transparency masters provide an illustrated lecture on marsh food webs, roles of a marsh and human

impact. The concepts are universal, but the organisms are not present in southern Florida. Pre and post test, 29 slides. 1 class period.
T:I,H $5-10

2047. DIATOMS: NATURE'S AQUATIC GEMS
Botany; Unit. A teacher's guide, student reading, handouts, and slides introduce these organisms. There are study questions, an anagram, instructions for collecting, and a diatom key. 2-4 class periods with an optional field trip.
T,S:I,H $0-5

2048. PESTICIDES AND THE MARINE ENVIRONMENT
Botany; Unit. Information on studies of the effects of pesticides on phytoplankton give the student experience in data analysis and research design. 1-2 class periods.
T,S:I,H $0-5

2049. FOOD WEBS IN THE MARINE HABITAT
Ecology; Unit. Food webs, marine habitats and trophic levels are studied using handouts, inquiry, test and glossary. This is a good infusion unit for life science/biology classes or a section of a marine science course. 3-4 class periods.
T,S:I,H $0-5

2050. ENDANGERED SPECIES
Zoology; Unit. Five lessons with background information for teacher, lecture notes, and handouts. Each lesson has student activities ranging from reports to a simulation game. A glossary and test are included. 5-10 class periods.
T,S:I,H $0-5

2051. SEA FLOOR SPREADING.
Geology; Unit. Student is led progressively through the text selection to the logical conclusion of plate tectonics. This unit is designed for independent study or for class discussion. Text handouts, questions and teacher's guide are included. 5 or more class periods.
T,S:I,H $0-5

2052. MARINE ECOLOGY, Sea World, 7007 Sea World Dr., Orlando, FL 32809.
Ecology; Unit. Life styles of marine organisms are explored, including locomotion, protection, sensory, feeding, and respiration. There is teacher background information, handouts, tests, multidisciplinary activities and a lesson in symbiosis. 30 pp.
T,S:I,H $0-5

2053. INVESTIGATING THE MARINE ENVIRONMENT AND ITS RESOURCES: TAMU-SG-79-401, Violetta Lien; Sea Grant College Program, Texas A&M, College Station, TX 77843.
Ecology, Social Studies, Language Arts; Activity. This highly recommended package has more than 100 activities, a teacher's guide, goals and objectives for each of 21 topic clusters. There is plenty of background information and good illustrations presented in a looseleaf

form. Supplementary to written material are two film strips with cassettes and marine organism cards for two games.
T,S:I,H $10-20/complete
$5-10/text only
$0-5/cards only

2054. MARINE SCIENCE PROJECT CARDS, 1978, John Fleming; Center for Applied Research in Education, Inc., West Nyack, NY 10994.
Oceanography; Activity, Lab. These are designed to enrich and complement the science curriculum and encompass a broad range of student interest and ability. Little or no teacher supervision or preparation are necessary. There is one card for each activity and includes the problem, simple materials procedure, presentation of results and suggestions for further reading. 25 cards.
S:I,H $5-10

Entries 2055-2057 may be ordered from Project COAST; 104 Willard Hall Ed. Bldg., University of Delware, Newark, DE 19711.

2055. A COMPARATIVE STUDY OF CLAM AND SQUID
Biology; Lab. Comparison of two mollusks using dissection, diagrams, procedure instructions and background information. Also included are suggestions for observation of live clams, pre and post tests and a crossword puzzle. 4 or more class periods.
T,S:I,H $0-5

2056. OBSERVING STARFISH--THE WATER VASCULAR SYSTEM
Biology; Lab. Directed observation of a live starfish, background information for teacher, procedures for simple experiments and maintenance of live starfish. Test, vocabulary, and handouts are included. 30 or more class periods.
T,S:I,H $0-5

2057. TESTING WATER FOR BACTERIAL POLLUTION
Ecology; Lab. Background information on bacteria and sampling techniques are given. Sample data and guides to data analysis are provided. 3-4 class periods, field trip.
T,S:I,H $0-5

2058. TIDAL MARSHES, 1980, James Gosslink; Information Transfer Specialist, National Coastal Ecosystems Team, U.S. Fish and Wildlife Service, NASA-Slidell Computer Complex, 1010 Gause Blvd., Slidell, LA 70458.
Ecology; Reference. Very nice introductory text to the tidal marshes enhanced by excellent color graphics and line drawings. Good infusion material and handout booklets for student's and parents' personal libraries. 12 pp.
T,S:I,H,A Free

2059. A SEA OF TROUBLES, 1975, J. J. McCoy; Clarion Books, 815 2nd Ave., New York, NY 10017.
Social Studies; Reference. A wide ranging narrative of human impact on the sea and sea life. The author considers ecology, economics, politics, and history in this dramatically presented report. 180 pp.
T,S:I $0-5

2060. MAN MEETS COAST, Diane Barile; Sea Grant G022 McCarty Hall, University of Florida, Gainesville, FL 32611.
Social Studies; Activity. This simulation game is designed to demonstrate human and marine interrelationships, to teach coastal processes and resources, and to provide decision making and coastal management experience. Time to play the game is from 80 to 120 minutes and teacher preparation is necessary.
S:I,H $0-5

2061. LAND USE FOR MARSH BEACH, 1980, Bobby Irby; Alabama Cooperative Extension Service, Mobile, AL
Ecology, Social Studies; Activity. This simulation game deals with land use of a beach marsh that was bought by a city. 9 pp.
T,S:I,H $0-5

2062. SEAFOOD TRANSPARENCY MASTERS WITH TEXT, VPI-SG-80-06, Linda Thompson, et al; Sea Grant Extension Division, Virginia Polytechnic Institute and State Unviersity, Blacksburg, VA 20461.
Vo-tech; Activity. Sixty-four high quality transparency masters, each accompanied by an explanatory text. They highlight most of the fish and shellfish of a major commercial importance in America. This series is intended to accompany Sea Food Products Resources Guide (entry 2188) but may be used independently.
T,S:I,H $0-5

Entries 2063 and 2064 are units built around field trips with personnel trained in field work. These materials have been available with Title IV-C adopter grants and several Florida districts have adopted them. All of these units have a printed booklet for the teachers which includes instructions, copies of all student materials, scripts for slide shows and directions for classroom activities. All give a brief list of what will be done in the field and copies of tests with answer sheets.

2063. SPOIL ISLAND INVESTIGATION: SEVENTH GRADE
Ecology; Unit. Total ecological relationships in the estuarine environment including physical and biological transect line studies, energy webs, data compilation. 3 weeks in classroom plus 2 field days.
T,S:I $0-5/text only

2064. BEACH INVESTIGATION: EIGHTH GRADE
Ecology; Unit. Beach dynamics and the impact of man's coastal structures. Studies of organisms, sand grain sizes, and a beach profile. 4 weeks in classroom plus 2 field trips.
T,S:I $0-5/text only

2065. ESTUARINE ECOLOGY -- FIELD TRIP GUIDE, 1977, Crystal River Marine Science Station, Rt. 3, Box 45013, Crystal River, FL 32629.
Ecology; Field. Although this guide is designed for Crystal River, the information, worksheets, tests and identification guides are applicable statewide. This unit includes tides, food webs, vocabulary, organism identification, plant collection and preservation, fossils and even some yummy seafood recipes.
T,S:I $0-5

2066. A GUIDE TO FIELD STUDIES FOR THE COASTAL, ENVIRONMENT, 1981, Project CAPE; Dare County Board of Education, P.O. Box 640, Manteo, NC 27954.
Ecology; Field, Activity. Teaching module comprised of a collection of 25 investigations to supplement junior high earth science. The objective is to provide ideas from which teachers can choose and use to develop a teaching module that will meet the specific needs of the class. Lessons include waves, currents, water table studies, dunes, stream flow, chemistry and soil studies.
T:I $0-5

2067. FIELD STUDY OF THE MARINE ENVIRONMENT: 4-H LEADERS GUIDE, 1979, Florida Cooperative Extension Service, Institute of Food and Agricultural Sciences, University of Florida, Gainesville, FL 32611.
Ecology; Field. This teacher's guide details the organization for an intertidal zone study and follow up. There are sections on plankton, net and sieve construction and use, and details for measuring salinity. The book list has good titles but some are out of print and quoted prices are out of date. 11 pp.
T,S:I,H $0-5

2068. INTERTIDAL ZONE PROJECT: 4-H PROJECT GUIDE, 1979, Florida Cooperative Extension Service, Institute of Food and Agricultural Sciences, University of Florida, Gainesville, FL 32611.
Ecology; Field. Six field activities are given which have background information, sampling techniques, data sheets, data interpretation, appropriate drawings and diagrams, resource list, and a section for summarizing all activities. 76 pp.
T,S:I,H $0-5

Entries 2069-2074 may be ordered from Project COAST, 104 Willard Hall Ed. Bldg., University of Delaware, Newark, DE 19711.

2069. UTILIZATION OF ESTUARINE ORGANISMS BY INDIANS
Social Studies; Unit. Background descriptions of estuarine organisms followed by two dozen slides. Extensive text and activities take the student through history of utilization of these organisms by man.
T,S:I $10-20

2070. DISTRIBUTION OF SALTMARSH LIFE
Ecology; Field. Teacher preparation material, field investigation directions, worksheets and prepared handouts make this a useful self-contained infusion unit. 1 or more class periods.
T,S:I,H $0-5

2071. BEACHES: A GEOLOGICAL STUDY
Geology; Field. Preparation for this exercise involves work with a local navigation chart of the field sites and the construction of simple sampling equipment (directions included). In the field students will do beach profiles, core samples, water samples, tidal measurements wave and water analysis. Directions are included for data analysis along with discussion questions.
T,S:I,H $0-5

2072. ZONATION OF A ROCKY COAST.
Ecology; Field. After the student becomes familiar with common organisms in the rocky shore habitat, an on site study is conducted with emphasis on the reasons why there is or is not zonation. This study can be conducted on jetties, seawalls or pilings. 2 class periods.
T,S:I,H $0-5

2073. THE ROCK SHORE
Ecology; Field. Trip preparation with background information and handouts direct student observation in the field. Also included are worksheets, follow up activities, pre and post tests, and seven slides illustrating zonation. 2-3 class periods, 1 field day.
S:I,H $0-5

2074. THE SUBSETS OF THE COASTAL ZONE
Math; Unit. The student is led through sets, intersections, unions, and complements with Venn diagrams. He then uses coastal zone organisms to apply set theory. 1 class period.
S:I $0-5

2075. BEACHES IN MOTION, Lee County Environmental Education Center, 2055 Central Ave., Ft. Myers, FL 33901.
Geology; Field. Directions for student beach investigations lead to knowledge of beach dynamics, long shore currents, waves, beach zonation. Followup classroom studies and a section on man's impact are included. 25 pp.
S:I,H $0-5

2076. THE NOMADIC BEACH, 1980, Mac Rawson; Alabama Cooperative Extension Service, Mobile, AL.
Geology; Field. Individual student field investigations of beach dynamics. 6 pp.
S:U,I $0-5

2077. HOW DO PEOPLE USE LIGHTHOUSES AND NAVIGATIONAL CHARTS, 1980, John Butzow; NNEMEP, 206 Shibles Hall, University of Maine, Orono, ME 04469.
Social Studies, Math; Unit, Activity. This marine infusion unit introduces the student to lighthouses, charts, navigation, and the life of a lighthouse keeper. Although the setting is New England the navigation activities can be done with local charts, and history activities can utilize Florida folklore. 54 pp.
T,S:I $0-5

2078. WHAT IS OUR MARITIME HERITAGE, 1980, John Butzow; NNEMEP, 206 Shibles Hall, University of Maine, Orono, ME 04469.
History, Social Studies; Unit. The illustrated text details various sailing vessels and building procedures, and discusses modern fishing vessels. There are classroom activities centered around buoyancy, boat building, sailing and even some sea chanties. Excellent handouts are provided. 55 pp.
T,S:I $0-5

2079. COASTAL BEGINNINGS, UNIT FOUR, UNC-SC-78-14-E, L. Mauldin, et al; UNC State University, Raleigh, NC 27650-5001.
History, Social Studies; Unit. This is part of a series of multi-disciplinary units (entries 2018-2020). This unit provides an introduction to the history of coastal people and includes methods used by anthropologists to unravel the past. The main theme is the integration of the environment and the people.
T,S:I $0-5

Entries 2080-2087 may be ordered from Public Affairs Division, U.S. Coast Guard, Washington, DC 20590.

2080. SAGA OF THE U.S. COAST GUARD, 1977, Dennis Noble, T. O'Brien.
History; Reference. An easy to read and dramatic history of the formation of the U.S. Life Saving Service and its eventual merger with the U.S. Revenue Cutter Service to form the U.S. Coast Guard. 12 pp.
T,S:I,H,A $0-5

2081. SILENT WITNESS, Joi Atcheson.
History; Reference. History of Pensacola Bay Lighthouse. 3 pp.
T,S:I,H,A $0-5

2082. WILLIAM COOKE'S U.S. REVENUE CUTTER "DILIGENCE" 1792-1798, Florence Kerr.
History; Reference. A delightful, illustrated presentation of this ship, its captains, its engagements against privateers, and an update through the cutter "Diligence VI". 40 pp.
T,S:I,H,A $0-5

2083. RICHARD TAYLOR'S U.S. REVENUE CUTTER "VIRGINIA" 1791-1797, Florence Kerr.
History; Reference. An easy to read, illustrated story of this ship, its captains and its engagements. A wonderful way to absorb early American history. 49 pp.
T,S:I,H,A $0-5

2084. ROBERT COCHRAN'S U.S. REVENUE CUTTER "SOUTH CAROLINA", 1793-1798, Florence Kerr.
History; Reference. Exciting history of this ship, its captain and other ships he commanded. It graphically details conflicts with the British Navy in 1798. 48 pp.
T,S:I,H,A $0-5

2085. BLACK HEROES OF PEA ISLAND, 1980, T. O'Brien.
History; Reference. The exciting story of one unit of U.S. Life Saving Service based on the Outer Banks of North Carolina from 1879 to its deactivation in 1947. 7 pp.
T,S:I,H,A $0-5

2086. THE UNITED STATE'S COAST GUARD AND THE CIVIL WAR, 1972. Truman Strobridge.
History; Reference. Exciting sea engagements told from the Mariner's standpoint. Enlivens a text book course.
T,S:I,H,A $0-5

2087. AMERICA'S WORKING HERITAGE, 1981, Edwin Mairs.
Multidisciplinary; Reference. The author sailed on a summer training cruise of the U.S. Coast Guard Barque "Eagle". He describes the vessel and sailing routine for cadets and gives a feel for the sea sailing ships. 6 pp.
T,S:I,H,A $0-5

2088. ECONOMIC AND POLITICAL EXPLORATION OF MARINE RESOURCES, Project COAST; 104 Willard Hall, Ed. Bldg., University of Delaware, Newark, NJ 19711.
Social Studies; Unit. Four topics (marine resources, marine food resources, whaling and fur seals) are explored with readings, inquiry, slides, quizzes and tests. 4 class periods.
T,S:I,H $0-5

2089. SALVAGE DIVER, 1961, Zachary Ball; Holiday House, 18 E 53rd St., New York, NY 10022.
Language Arts; Reading. The adventures of two Seminole boys aboard a salvage ship. Good information is given about underwater exploration.
S:I,H $5-10

2090. ANATOMY OF A RIG: GENESIS OF AN INDUSTRY, 1980, Robert L. Scheina; Pubic Affairs Division, U.S. Coast Guard, Washington, DC 20590.
Vo-tech; Reference. Although this details U.S. Coast Guard responsibility, this selection is most useful for its 11x15" labeled drawing of an offshore oil rig. 4 pp.
T,S:I,H,A $0-5

2091. LITERATURE AND THE SEA, Jennifer Katahira; ORCA, Pacific Science Center, 200 2nd Ave., N, Seattle, WA 98109.
Language Arts, Social Studies; Unit. A twelve-day unit which includes short stories, poems, music and longer prose selections. As in all ORCA units, there is a variety of student activities, each of which includes objectives, teacher preparation, materials, procedures, extended activities and bibliography. 85 pp.
T,S:I $5-10

2092. SPILL, 1977, Chester Aaron; Scribners, 597 Fifth Ave., New York, NY 10017.
Language Arts; Reading. This is the moving story of a family with growing teenagers set against a background of one of the country's most destructive oil spills. See entry 1054 for supplementary activities based on this book. 214 pp.
S:I $5-10

2093. THE RA EXPEDITIONS, 1972, Thor Heyerdahl; Signet Books, P.O. Box 888, Bergenfield, NJ 07621.
Language Arts; Reading. Five stories of the author's attempted voyage across the Atlantic in a reed boat to prove the theory that North Africans arrived in South America long before the rise of the Inca culture. See entries 2094-2096 for supplementary units.
T,S:I,H,A $0-5

Entries 2094-2097 may be ordered from Project COAST, 104 Willard Hall, Ed. Bldg., University of Delaware, Newark, DE 19711.

2094. THE RA EXPEDITIONS: ARCHEOLOGICAL AND ANTHROPOLOGICAL BACKGROUNDS.
Social Studies; Unit. After students have read the book, this unit will lead them in exploring the diffusionist vs isolationist theories of cultural development. Teacher's guide, handouts and tests are included. 2-3 class periods.
T,S:I,H $0-5

2095. THE RA EXPEDITIONS: THE CORIOLIS EFFECT.
Physics, Social Studies; Unit. Students learn about the Coriolis Effect and its influence on winds and currents that could have made crossings of the Atlantic by primitive boats possible. Teacher's guide, handouts, simple experiments and tests are included. 2-3 class periods.
T,S:I,H $0-5

2096. THE RA EXPEDITIONS: PAPYRUS REED.
Botany, Social Studies; Unit. A study of the papyrus reed and its influence on the Nile civilization. Teacher's guide, tests, field and lab directions, and handouts are included. 1-2 class periods, 1 field day.
T,S:I,H $0-5

2097. KON-TIKI.
Social Studies, Unit. Students are taught how to develop a hypothesis. This should be done before the students read the book. The unit provides a good demonstration for the relationship of ocean currents to cultural development. Handouts and teachers guide are included. 1-2 class periods.
T,S:I,H $0-5

2098. THE BIRDMAN OF ST. PETERSBURG, 1981, Tom Schachtman; MacMillan Publishing co., 866 Third Ave., New York, NY 10022.
Language Arts, Zoology, Social Studies; Reference. This is the biography of Ralph T. Heath Jr.'s Suncoast Seabird Sanctuary. It is also the story of rescue, repair, recuperation and release of wild birds. It contains good natural history of the brown pelican plus "do and don't" precautions to avoid hooking them and "how to" tips on the care of orphaned birds. 78 pp.
T,S:I,H $5-10

2099. THE LOG FROM THE SEA OF CORTEZ, 1962, John Steinbeck; Viking Press, 625 Madison Ave., New York, NY 10022.
Language Arts, Vo-tech, Social Studies; Reading. The day-to-day story of Steinbeck's voyage with his marine biologist friend Ed Ricketts to collect marine invertebrates. A charming combination of science, philosophy and high-adventure which gives a fascinating insight into the personality and profession of a marine biologist. 282 pp.
T,S:I,H,A $0-5

SECONDARY GRADES, HIGH SCHOOL - ADULT

High School Teachers Please Note:

Look through the Junior High/High School (entries 2000-2999) also! There are many broad spectrum materials entered there that may be just what you want for your high school students.

2100. OCEAN SCIENCE, 1979, Keith Stowe; John Wiley and Sons, One Wiley Dr., Somerset, NJ 09973.
Oceanography; Textbook. This book covers geology, topography, water chemistry and movement, climate, biological productivity, environments, phyla, resources, history of oceanography and earth formation. Glossary, chapter questions, black and white photos, diagrams, add to student understanding. The reading level is somewhat advanced. 610 pp.
T,S:H,A $20-30

2101. OCEAN SCIENCE: AN INSTRUCTOR'S MANUAL, 1980, Keith Stowe; John Wiley and Sons, One Wiley Dr., Somerset, NJ 08873.
Oceanography; Textbook. Teacher's manual for entry 2100 has simple field experiments, answers to chapter questions, and complete multiple choice tests for each chapter. 200 pp.
T:H,A $5-10

2102. OCEANOGRAPHY: AN INTRODUCTION, 1979, Dale Ingmanson, William J. Wallace; Wadsworth Publishing Company, 10 Davis St., Belmont, CA 94002.
Oceanography; Textbook. An introductory college-level book that is a pleasure to read. More than 400 excellent photos and line drawings complement the text. There are suggested readings and vocabulary problems throughout the book. Subjects covered are origin and profile of the oceans, plate tectonics, coastal zones, chemistry, physics, marine life, environment, and man's impact. 367 pp.
T,S:H,A $10-20

2103. THE WORLD OCEAN: AN INTRODUCTION TO OCEANOGRAPHY, 1981, Anikouchine and Steinberg; Prentice-Hall, Rt. 9 W, Englewood Cliffs, NJ 07632.
Oceanography; Textbook. This introductory college material can be used with advanced high school students. Vocabulary, glossary, and reading list are included in each chapter along with uninspired photos and good line drawings. Subjects covered are geology, chemistry, physics, some biology and ecology and excellent coverage of marine sediments and oceanographic instruments. 527 pp.
S:H,A $10-20

2104. INTRODUCTION TO OCEANOGRAPHY: SECOND EDITION, 1977, David A. Ross; Prentice-Hall, Rt. 9 W, Englewood Cliffs, NJ 07632.
Oceanography; Textbook. This introductory college text can be used for advanced high school students. Subjects covered are geology, chemical, physical and some biological oceanography with good chapters on man's relationships to the ocean--the resources, pollution, law and innovative uses.
S:H,A $10-20

2105. INTRODUCTORY OCEANOGRAPHY, 1978, Joseph Weisberg, Howard Parish; McGraw-Hill, 1221 Avenue of the Americas, New York, NY 10020.
Oceanography; Textbook. This very readable, well-illustrated high school text has been adopted by Duval County for their marine science course. The emphasis is on physical and geological oceanography but there is some chemical, biological, climate, and resource information. Each chapter has summary questions and there is a glossary. 330 pp.
T,S:H,A $10-20

2106. WAVES AND BEACHES, 1980, Willard Bascom; Anchor Books, Doubleday and Company, 245 Park Avenue, New York, NY 10017.
Oceanography, Geology; Reference. Revised and enlarged, this book is the one reference consistently used by teachers and students to expand knowledge of this subject beyond standard textbook coverage. Diagrams are informative and photos supplement technical understanding with dramatic, visual demonstration. 361 pp.
T,S:H,A $5-10

2107. WIND WAVES AT SEA, BREAKERS AND SURF, 1974, H.B. Bigelow, W.T. Edmondson; DMA Distribution Center, 5801 Tabor Avenue, Philadelphia, PA 19120.
Oceanography; Reference. The subject matter is good, easily understood and enhanced by good illustrations. 75 pp.
T,S:H,A $0-5

2108. DRIFT BOTTLE ANALYSES OF EASTERN GULF OF MEXICO SURFACE CIRCULATION, 1977, Jean Williams et al.; Marine Research Laboratory, DNR, 100 8th Avenue, SE, St. Petersburg, FL 33701.
Oceanography; Reference. Memoirs of the Hourglass Cruises Vol. IV, Part III. This can be used by the class in two ways: (1) The students can learn the variables that must be taken into account when analyzing data and learn when there is enough data on which to base conclusions. (2) Students can compare their own drift bottle data with these studies. 134 pp.
T,S:H,A $0-5

2109. SCIENCE AND THE SEA: VOLUME II, 1970, Naval Oceanographic Office, DMA Distribution Center, 5801 Tabor Avenue, Philadelphia, PA 19120.
Oceanography; Reference. This collection of pilot chart articles acquaints students and teachers with the more practical aspects of oceanography, hydrography, and navigation. Included is information on geology, waves, survival at sea, navigation, fishery and research vessels

and gear, and case studies of collisions. This is good infusion material and will add some zing to a class lecture. 83 pp.
T,S:H,A $0-5

2110. SCIENCE AT SEA, TALES OF AN OLD OCEAN, 1981, Tjeerd VanAndel; W.H. Freeman and Company, 660 Market St., San Francisco, CA 94104.
Multidisciplinary; Text. Interesting fact-filled narrative with illustrations set against a background of the author's personal experience in oceanographic exploration. Much of the information is in a historical context with discussions of resource exploitation from scientific, economic and social standpoints. 186 pp.
T,S:H,A $5-10

2111. COASTAL AWARENESS: A RESOURCE GUIDE FOR TEACHERS OF SENIOR HIGH SCIENCE, 1978, Frederick Rasmussen; Office of Coastal Zone Management, NOAA, 3300 Whitehaven St., NW, Washington, D.C. 20235.
Oceanography; Reference. Short discussions of wind, waves, tides, currents, beaches, rocky shores, estuaries and marshes are supplemented by field and classroom activities, and an excellent reading list. 1 week unit.
T:H Free

2112. A STUDY OF SEA WATER, Donald DuClose; Duval County Marine Center, 1347 Palmer St., Mayport, Florida 32233.
Chemistry; Unit. Objectives for this unit include proficiency in the use of standard laboratory equipment and the understanding of chemically-related ecological principles. Transparency masters, references, vocabulary, and text are in the unit. The film, "The Restless Sea," is a recommended supplement. 2 weeks.
T,S:H $0-5

2113. STANDARD CHEMICAL ANALYSIS, Duval County Marine Center, 1347 Palmer St., Mayport, FL 32233.
Chemistry; Lab, Unit. This stands alone or as a supplement to "A Study of Sea Water" (entry 2112). It includes tests for cadmium, chromium, phenols, surfactants, arsenic and lead. 13 pp.
T,S:H $0-5

Entries 2114-2117 may be ordered from Project COAST, 104 Willard Hall, Education Building, University of Delaware, Newark, DE 19711.

2114. PHYSICAL PROPERTIES OF SEAWATER.
Physics; Unit. Comprehensive outline of topics covered and good handouts are included but the teacher must either learn the material from other sources or have students do research. The time frame depends on method and depth of study.
T,S:H $0-5

2115. SALINITY CHANGES IN A TIDAL RIVER.
Physics; Unit, Field, Lab. This may be self-study or a lecture exercise. Information on tides and salinity/density relationships, instructions on the use of tide tables, how to make salinity measurements and field trip

instructions are included. The appropriate worksheets, handouts, tests, and discussion topics complete the unit. 4-5 class periods.
T,S:H $0-5

2116. MERCURY - ITS CHEMISTRY IN THE ECOSYSTEM
Chemistry; Unit. This unique self-study unit with text, charts and diagrams explains mercury, its various compounds, industrial uses and mercury poisoning. Topics for group discussion and tests are included. 1-4 class periods.
T,S:H $0-5

2117. THE OIL SPILL PROBLEM.
Social Studies; Unit. Readings, data analysis and inquiry are used to explore the economics of super tankers, techniques of oil spill removal and environmental effects of oil pollution. Teachers guide is included.
T,S:H $0-5

2118. LAND FROM THE SEA, 1974, J.E. Hoffmeister; University of Miami Press, Drawer 9088, Coral Gables, FL 33124.
Geology; Reference. This is an excellent book for the layman interested in South Florida geology. The text is enhanced by drawings and photos. This book should be background reading for every South Florida science teacher. 143 pp.
T,S:H,A $10-20

2119. THE BEACH - A NATURAL PROTECTION FROM THE SEA. William Sensabaugh; Marine Advisory Program, G022 McCarty Hall, University of Florida, Gainesville, Fl 32611.
Physics; Reference. A nutshell description of beach dynamics includes a beach profile, explanation of littoral drift and the function of sand dunes. 5 pp.
T,S:I,H,A Free

2120. BEACH DUNE WALKOVER STRUCTURE, Todd Walton, Thomas Skinner; G022 McCarty Hall, University of Florida, Gainesville, FL 32611.

Entries 2121-2129 may be ordered from the Bureau of Geology, Florida Department of Natural Resources, 903 W. Tennessee St., Tallahassee, FL 32304.

2121. ANCIENT SEA LEVEL STANDS IN FLORIDA, 1970, E.C. Pirkle, et al.
Geology; Text. Detailed descriptions of ancient sea bed sediments found along the north-south central ridge of Florida. 61 pp.
T,S:H,A $0-5

2122. TERRACES AND SHORELINES OF FLORIDA, 1975, Henry Healy.
Geology; Text, Reference. An eight-color wall map shows Florida topography and includes a written explanation of terraces, modifications of terraces and shorelines.
T,S:I,H,A $0-5

2123. ENVIRONMENTAL GEOLOGY SERIES, 1981, Ed Lane.
Geology; Text, Reference. One of 12 area three-color wall maps which

show substrate types and discuss the geology, physiography, water resources, climate, population and economy.

2124. PALEOCENE FORMINIFERA OF THE GULF COASTAL REGION OF THE UNITED STATES AND ADAJCENT AREAS: PP32, 1951, Joseph Cushman.
Geology; Identification Guide. Excellent black and white plates for fossil identification are accompanied by detailed descriptions and locations. Useful tool for preparing students for microscopic examination of sands. 123 pp.

2125. EOCENE MOLLUSKS FROM CITRUS AND LEVY COUNTIES: B-35, 1953, Horace Richards, Katherine Palmer.
Geology; Identification Guide. This fossil identification with black and white pictures and detailed descriptions has broad application for Florida fossils and is of interest to students as a comparison with living types. 95 pp.
T,S:H,A $0-5

2126. CORALS FROM THE CHIPOLA AND JACKSON BLUFF: B-53, 1971, Normar Weisbond.
Geology; Identification Guide. Black and white pictures are accompanied by descriptions, geologic age, and background information on geologic formations where fossil corals are found. There are interesting comparisons with living types. 105 pp.
T,S:H,A $0-5

2127. ENCROACHING SALT WATER IN NORTHEAST PALM BEACH COUNTY, 1973, Harry Rodis.
Geology; Text, Reference. Wall map of the Loxahatchee River system includes black and white photos three-color diagrams, and written material on its current status, history and future.
T,S:I,H,A $0-5

2128. POSSIBILITY OF SALTWATER LEAKAGE FROM PROPOSED INTRACOASTAL WATERWAY NEAR VENICE, FLORIDA WELL FIELD: RI 38, 1964, William Clark.
Geology; Text. Maps, charts, and written information on hydrogeology, well fields, saltwater intrusion possibilities, and a good presentation of applied math. 33 pp.
T,S:H,A $0-5

2129. SALTWATER STUDY OF THE MIAMI RIVER AND ITS TRIBUTARIES, DADE COUNTY, FLORIDA: RI 45, S.D. Leach and R.G. Grantham.
Geology; Text. Maps, charts, pictures and written information on hydrogeology, saltwater intrusion, canal systems, structures, and water management. 36 pp.
T,S:H,A $0-5

2130. AN INTRODUCTION TO THE BIOLOGY OF MARINE LIFE, 1976, James Sumich; William C. Brown, 2460 Kerper Blvd., Dubuque, IA 52001.
Biology; Textbook. Although written for introductory level college

students, many teachers have found this book excellent. It is accurate, well written and illustrated. Chapters include marine environment, survey of animal groups, role of plants and animals adaptation and man's impact. Suggested further readings, a summary and discussion questions finish each chapter. There is an excellent teacher's manual with suggestions for use of the book with a 1 or 2 semester course and a Lab and Field Guide (entry 2169). 373 pp.
T,S:H,A $10-20

2131. MARINE BIOLOGY, 1979, John Reseck; Reston Publishing Co., 11480, Sunset Hills Rd., Reston, VA 22090.
Biology; Textbook. This is the only state adopted text until 1986. The reading level is appropriate for grades 9 and 10 but there are errors and significant supplementary material is needed to round out information for a high school course. There are black and white photos, vocabulary, chapter review questions but no lab or teacher's guide. 257 pp.
T,S:I,H $10-20

2132. LIFE IN THE SEA, 1971, Gunnar Thorson; McGraw-Hill, 1221 Avenue of the Americas, New York, NY 10020.
Biology; Text. Good habitat approach to marine life. There are chapters on plankton, nekton, benthos, intertidal zone, abyssal zone, etc. Photos and drawings enhance understanding. 256 pp.
T,S:I,H,A $0-5

2133. FISH, A TALE OF SUCCESS, 1976, Dr. Wayne R. Schade; Austin Independent School District, 6100 Guadalupe, Austin, TX 78752.
Zoology; Unit. Three mini courses that include fish morphology and anatomy, aquaculture, field trip and research project suggestions. This unit is accompanied by a teacher's manual.
T,S:H $0-5

2134. ECOLOGY OF INLAND WATERS AND ESTUARIES: 2ND EDITION, 1976, George Reid, Richard Wood; Van Nostrand Reinhold, 135 W. 50th St., New York, NY 10020.
Ecology; Text. This college material is useful to the secondary teacher from a theoretical ecology standpoint. It is well written, has basins, and channels, estuaries and oceans, environmental variables, review of organisms and aquatic communities. It is not Florida specific. 485 pp.
T:H,A $10-20

2135. COASTAL ECOSYSTEMS, 1975, John Clark; Publications Dept., The Conservation Foundation, 1917 Massachusetts Avenue, NW, Washington, D.C. 20036.
Ecology, Social Studies; Reference. All salient points in coastal zone ecology and management are covered in a brief, well written text enhanced by excellent line drawings. 178 pp.
T,S:H,A $5-10

2136. THE PRODUCTIVITY OF THE SEA, D.H. Cushing; Carolina Biology Reader, Scientific Publications Department, Carolina Biological Supply, 2700 York Rd., Burlington, NC 27215.
Ecology; Reference. Line drawings of plankters along with a discussion

of their production cycle, currents, nutrients, and grazing. Full understanding of the text and graphics require a basic knowledge of theoretical ecology. 16 pp.
T:H,A $0-5

2137. THE EROTIC OCEAN, 1971, Jack Rudloe; Gulf Specimen Company, P.O. Box 237, Panacea, FL 32346.
Language Arts, Biology; Reference, Reading. This book is a baited hook for incipient marine biologists. In an easy-going narrative, ten habitats are described objectively and subjectively. Fifteen chapters accurately describe many phyla with little technical language and a lot of natural history. There is information on collection and preservation methods, shipping techniques, and aquarium keeping. 447 pp.
T,S:I,H,A $10-20

2138. THE SEA AROUND US, 1961, Rachel Carson; The New American Library, 1301 Avenue of the Americas, New York, NY 10019.
Language Arts; Reference, Reading. The enthralling and poetic, classic survey of the sea and its history, features of the ocean floor, power of the wind, waves, currents, tides and the meaning of the ocean to man. An unforgettable insight into the science and poetry of the sea. 221 pp.
T,S:H,A $0-5

2139. LIFE AND DEATH IN THE SALT MARSH, 1969, John and Mildred Teal; Ballantine Books, 201 E. 50th St., New York, NY 10022.
Ecology, Social Studies; Reference. A classic narrative which tells how marshes are developed, their inhabitants, their enormous contribution to man and how ruthlessly man is destroying them. Elegant drawings are sprinkled throughout. 275 pp.
T,S:H,A $0-5

2140. CLASSIFICATION OF WETLANDS AND DEEPWATER HABITATS OF THE UNITED STATES: S/N 024-010-00-524-6, 1980, Supt. of Documents, U.S. Government Printing Office, Washington, D.C. 20402.
Ecology; Reference. Wetlands are classified into system, subsystem and class, through characteristic photos, dichotomous keys, dominant plant and animal associations, bottom type, salinity, shoreline and water regime. 103 pp.
T,S:H,A $0-5

Entries 2141-2145 may be ordered from the Information Transfer Specialist, U.S. Fish and Wildlife Service, Slidel Computer Complex, 1010 Gause Blvd., Slidell, LA 70458.

2141. ATLANTIC COAST - ECOLOGICAL INVENTORY - FWS/OBS 80/51, Dames and Moore.
Ecology; Reference. A series of maps, combined with user's guide, provide an overview of coastal habitat and species. The maps indicate concentrations of certain animals and the presence of endangered and threatened species. They also show land use and salinity patterns. The user's guide has special sections on the sea islands. East Florida and Biscayne Bay environs. User's guide. 164 pp. Maps of local interest:
Jacksonville 300080-A1-EL-250

Daytona Beach 29080-A1-E1-250
Fort Pierce 27080-A1-E1-250
West Palm Beach 26080-A1-E1-250
Miami 25080-A1-E1-250
T,S:H,A $0-5

2142. THE ECOLOGY OF INTERTIDAL OYSTER REEFS OF THE SOUTH ATLANTIC COAST: A COMMUNITY PROFILE - FWS/OBS-81/15, Leonard Bahr, William Lanier.
Ecology, Zoology; Reference. This detailed study of oyster reefs is obviously most useful in areas with oyster populations. Oyster anatomy, physiology, and life cycle, discussed in detail along with reef structure, energetics and associated organisms. 110 pp.
T,S:H,A $0-5

2143. ECOLOGICAL CHARACTERIZATION OF THE SEA ISLAND COASTAL REGION OF SOUTH CAROLINA AND GEORGIA - FWS/OBS-7940-79/45.
VOL I - PHYSICAL FEATURES
VOL II - SOCIOECONOMIC FEATURES
VOL III - BIOLOGICAL FEATURES-EXECUTIVE SUMMARY
Ecology, Social Studies; Reference. Immense and definitive tome with universal concepts. These three narrative volumes are accompanied by an oversized beautifully and colorfully illustrated characterization atlas. Single volumes of this collection can be of great use in ecology, earth science, and social studies in addition to marine science classes. 1000 plus pp.
T,S:H,A $0-5

2144. ECOLOGY OF INTERTIDAL FLATS OF NORTH CAROLINA: A COMMUNITY PROFILE; FWS/OBS-79/39, Charles and Nancy Peterson.
Ecology, Social Studies; Reference. This volume is applicable to Florida because of similarity in environment and organisms. The information is more detailed than most textbooks in geological, chemical, and biological parameters. Subjects included are seasonal changes, estuaries as nutrient traps, productivity, food chains, trophic levels, and a chapter on birds and their feeding habits. The chapter entitled "Practical Problems in Managing Intertidal Flats" is useful in social studies classes. 73 pp.
T,S:H,A $0-5

2145. PROCEEDINGS - U.S.F.W.S. WORKSHOP ON COASTAL ECOSYSTEMS OF THE SOUTHEASTERN UNITED STATES; FWS/OBS-80/59.
Ecology, Social Studies; Reference. Up-to-date and useful information in collected papers on various aspects of coastal ecosystems such as ecology of coastal marshes, mangroves, sea grasses, coral reefs, and mudflats. There is also a section on problems in coastal resource management. 257 pp.
T,S:H,A $0-5

2146. THE FISH AND WILDLIFE RESOURCES OF THE SOUTH ATLANTIC COAST, 1981, William Gusey; Environmental Affairs, Shell Oil Company, P.O. Box 4320, Houston, TX 72210.

Ecology, Zoology; Reference. Six chapters cover water fowl and shore birds, marine mammals, refuges, estuaries, coastal wetland habitats and fisheries. Within each chapter is extensive habitat description, species population, breeding and natural history information, appropriate maps, charts and tables. 522 pp.
T,S:H,A $0-5

2148. THE LIVING DOCK AT PANACEA, 1977, Jack Rudloe; Gulf Specimen Company, P.O. Box 237, Panacea, FL 32346.
Biology, Language Arts; Reference. Loads of habitat information, natural history, collecting techniques, all told in compelling style that carries the reader along on the adventures of a commercial specimen collector. The author's love for and fascination with the marine world is evident throughout. 272 pp.
T,S:I,H,A $10-20

2149. TIME OF THE TURTLE, 1979, Jack Rudloe; Gulf Specimen Company, P.O. Box 237, Panacea, FL 32346.
Zoology, Language Arts; Reference. In a rollicking narrative style, the author imparts scientific information, history of turtle exploration, turtle research and protection measures, and a turtle hex. All of this is within the context of the author's adventures on collecting and research trips. 273 pp.
T,S:I,H,A $10-20

2150. SECRET LANGUAGES OF THE SEA, 1981, Robert Burgess; Dodd, Mead, and Company, 79 Madison Avenue, New York, NY 10016.
Zoology; Reference. Various forms of communication by marine fish and mammals are discussed including sound, light, body language, touch. Other sections discuss research in communication. Photos and drawings enhance the text. 244 pp.
T,S:I,H,A $10-20

2151. A HISTORY OF FISHES, 1975, J.R. Norman, P.H. Greenwood; John Wiley and Sons, 605 3rd Avenue, New York, NY 10016.
Zoology; Reference. A comprehensive natural history teeming with important and some whimsical facts and concepts. A good index, line drawings and a bibliography are included. Facts from this book will enrich any marine science course. 467 pp.
T:H,A $20-30

2152. THE NATURAL HISTORY OF SHARKS, 1970, Thomas Lineaweaver, Richard Backus; Harper and Row, Scranton, PA 18512.
Zoology; Reference. A good narrative that includes ancient myths, legends and some spectacular sea stories. Photos, key to family, glossary and bibliography are included. 256 pp.
T,S:I,H,A $10-20

2153. DIVING IN MARINE MAMMALS, 1971, R.J. Harrison, G.L. Kooyman; Scientific Publications Department, Carolina Biological Supply, 2700 York Rd., Burlington, NC 27215.
Zoology; Reference. Brief account of diving characteristics including duration, sleep patterns, anatomical and physiological adaptations. A

wealth of information for the teacher of advanced students. 16 pp.
T,S:H,A $0-5

2154. BUOYANCY IN MARINE ANIMALS, E.J. Denton; Scientific Publications Department, Carolina Biological Supply, 2700 York Rd., Burlington, NC 27215.
Zoology; Reference. A succinct account of the principal types of buoyancy mechanisms found in jelly fish, cephalopods, crustaceans, protozoans, and fish. Good photos and graphics. This information, along with the suggested reading, is excellent for the advanced student. 16 pp.
T,S:H,A $0-5

2155. SALT TOLERANT PLANTS FOR FLORIDA LANDSCAPES, 1979, William E. Barrick; Marine Advisory Program, G022 McCarty Hall, University of Florida, Gainesville, FL 32611.
Botany; reference. List of tolerancy levels of hundreds of trees, palms, shrubs, ground covers and vines. There are notes on where and how to plant, water and fertilize them. 72 pp.
T,S:H,A $0-5

2156. COASTAL PLANTS OF FLORIDA, A KEY TO GOOD MANAGEMENT, 1979, Florida Department of Agriculture and Consumer Services, Division of Forestry, University of Florida, Gainesville, FL 32611.
Botany; Reference. Very brief descriptions of dune and wetland areas complemented by excellent pictures of principal plant cover are included along with management techniques for coastal vegetation and bibliography.
T,S:H,A Free

Entries 2157-2168 may be ordered from Marine Research Laboratory, Department of Natural Resources, 100 8th Avenue E., St. Petersburg, FL 33701.

2157. A SURVEY OF SELECTED COASTAL VEGETATION COMMUNITIES OF FLORIDA, 1977, Jedfrey Carlton.
Botany; Reference. A capsule comparison of representative dune and wetland communities. 40 pp.
T,S:H,A $0-5

2158. A GUIDE OF COMMON FLORIDA SALT MARSH AND MANGROVE VEGETATION, 1975, Jedfrey Carlton.
Botany; Field, Reference. Good photos and written descriptions of the more obvious common plants in these communities. Some natural history, good taxonomy and a glossary are included. 30 pp.
T,S:H,A $0-5

2159. DIATOMS, 1969, Richard Saunders, Donald Glenn.
Botany; Identification Guide. Over 100 photos of diatoms are ample reason to obtain this paper. In addition, there are excellent analyses of population change, species diversity, biotic and abiotic factors. 119 pp.
T,S:H,A $0-5

2160. DINOFLAGELLATES, 1970, Karen Steidinger, Jean Williams.
Biology; Identification Guide, Reference. More than 170 photos of dinoflagellate species along with (a) analysis of sample data with discussion of seasonal variation in species and abundance, (b) life cycle description, (c) taxonomy, and (d) generic key. 251 pp.
T,S:H,A $0-5

2161. FLATFISHES (PLEORONECTIFORMES), 1972, Robert Todd, Frank Hoff, Jr.
Zoology; Identification Guide, Reference. Four flatfish families are discussed using keys, descriptions, drawings, life history and geography. There is an ecological key with a discussion of how many similar species can coexist. 139 pp.

2162. ECHINOIDS (ECHINODERMATA: ECHINOIDEA), 1979
Zoology; Reference, Identification Guide. Species identification is done by pictures, key and description. There is discussion of life history, habitat and population. 120 pp.
T,S:H,A $0-5

2163. BRACHIOPODS (RECENT), G. Cooper
Zoology; Reference. Excellent photos and life history of this abundant but rarely studied organism. The information could be used to help build student ability to synthesize by having them develop arguments for or against possible evolutionary relationships between mollusks, brachiopods and bryozoans. 17 pp.
T,S:H,A $0-5

2164. FLORIDA RED TIDES, 1973, Karen Steidinger, Edwin Joyce
Biology; Reference. In-depth information on this organism, its toxic properties and the effects of major "blooms". Some information on "bloom" prediction indices are included. 26 pp.
T,S:H,A $0-5

2165. ECOLOGY AND DISTRIBUTION OF EASTERN GULF OF MEXICO REEF FISHES, 1976, Gregory Smith.
Zoology; Reference. An excellent description of the physiography of the Eastern Gulf of Mexico along with a discussion of the relationship of biotic and abiotic factors and the effects of a massive red tide outbreak. 78 pp.
T,S:H,A $0-5

2166. PRELIMINARY INVENTORY OF MARINE INVERTEBRATES COLLECTED NEAR THE ELECTRICAL GENERATING PLANT CRYSTAL RIVER, FLORIDA IN 1969, 1971, William Lyons, et al.
Zoology; Reference, Field. This is a useful preparation material for a field trip to this area. 45 pp.
T,S:H,A $0-5

2167. NEARSHORE MARINE ECOLOGY AT HUTCHINSON ISLAND, FLORIDA 1971-1974, 1977.
VOL I - INTRODUCTION, SEDIMENTS, PHYSICAL AND CHEMICAL
VOL II - LANCELETS AND FISHES
VOL III - ARTHROPODS
VOL IV - PLANKTON AND BENTHIC ALGAE
Ecology; Reference. A good teaching example of an environmental assessment and physiography data. 295 pp.
T,S:H,A $0-5

2168. AN INVENTORY OF THE ESTUARINE FAUNA IN THE VICINITY OF PENSACOLA, FLORIDA, 1978, Nelson Cooley.
Zoology; Field, Reference. This document provides physical and chemical data on Pensacola estuary as well as species lists, descriptions, and seasonality data. This can be used to compare with student field trip data. 119 pp.
T,S:H,A $0-5

2169. LABORATORY AND FIELD INVESTIGATIONS IN MARINE BIOLOGY, 1981, James Sumich, Gordon Dudley; William C. Brown, 2460 Kerper Blvd., Dubuque, IA 52001.
Biology; Lab, Field. This is highly recommended by many teachers. It is used as a lab and field companion to the text (entry 2130) and thus the topics parallel those in the text. The equipment needed is readily available in most school labs and organisms used are abundant intertidal forms or readily available from supply firms. 194 pp.
S:H,A $10-20

2170. LABORATORY EXERCISES IN OCEANOGRAPHY, 1977, Pipkin et al.; William H. Freeman and Co., 660 Market St., San Francisco, CA 94104.
Oceanography; Lab. This can be used for a year-long course or selected portions can be used for a quarter or semester. Many of the exercises do not require equipment or even a laboratory situation. 255 pp.
S:H,A $10-20

2171. MARINE BIOLOGY FIELD AND LABORATORY MANUAL, 1975, Roger Lloyd, Jr.; Kendall/Hunt, 2460 Kerper Blvd., Dubuque, IA 52001.
Biology; Field, Lab. Modules range from Protozoa to Chordata and algae. They include phylum characteristics, reference material, collection data, preservation techniques, lab instructions and taxonomy. Supplementary 8mm film loops, slide transparencies, microscope slides and specimens are available from the author at Florida Junior College, South Campus, 11907 Beach Blvd., Jacksonville, FL 32216. 151 pp.
T,S:H,A $5-10

2172. LABORATORY ANATOMY OF A SHARK, 1950, Laurence Ashley; Sargent-Welch Scientific Company, 7300 N. Linder Avenue, Skokie, IL 60076.
Zoology; Lab. This dissection manual is introductory college level. A properly preserved shark is required for every one or two students. Dissection covers external anatomy, skeletal, muscular, digestive, respiratory, urogenital and nervous systems. 91 pp.
S:H,A $5-10

2173. THE SOURCE BOOK OF MARINE SCIENCES, 1980, Florida Oceanographic Society, 1212 Riverside Dr., Stuart, FL 33499.
Oceanography; Field Lab. This is an updated and expanded version of an old favorite. It has background information, explicit directions, thought-provoking questions, reference lists, and good drawings. All activities have been classroom tested. 170 pp.
T,S:I,H $5-10

2174. INVESTIGATING THE MARINE ENVIRONMENT: A SOURCE BOOK, 1979, Howard Weiss and Michael Dorsey; Project Oceanology, Avery Point, Groton, CN
Ecology; Lab, Field. Forty-nine field studies and 53 labs supplemented by a complete teacher's guide are presented in this three-volume set. Each exercise stands on its own and contains all of the necessary data sheets, study questions, instructions, and background material along with excellent photos and diagrams. Although some of the lab exercises require sophisticated equipment, many do not. The field material is based on Connecticut environments, but most is readily usable in Florida.
T,S:I,H,A $20-30/complete set

Entries 2175-2179 may be ordered from Project COAST, 104 Willard Hall, Education Building, University of Delaware, Newark, DE 19711.

2175. COLLECTING AND CULTIVATING MARINE BACTERIA.
Biology; Lab. Background information and detailed instructions are included in this lab exercise along with materials list, recipe for nutrient media, diagram of marine sediment formation and bacterial activity. This lab is rarely found in standard marine science manuals. 3 or more class periods.
T,S:H $0-5

2176. QUANTITATIVE AND QUALITATIVE ANALYSIS OF PHOSPHATE IN WATER.
Chemistry; Lab. Background information on the role of phosphorus in the biome along with instructions for using a spectrophotometer and making lab reagents. Tests are included. 6 class periods.
T,S:H $0-5

2177. MEASURING DISSOLVED OXYGEN QUANTITATIVELY.
Chemistry; Lab, Unit. Background information and detailed lab instruction are provided. Experiments include DO, DO vs. salinity and temperature, and data analysis of relationship of organisms to DO

parameters. Parts of this unit may be used independently. 5 or more class periods.
T,S:H $0-5

2178. SANDY BEACH ENVIRONMENT.
Botany; Field. Background information and field directions are provided for a shore profile, soil moisture content, vegetation transects. Students produce a final report. Included are 22 slides with script that show plants common to Delaware. 2 or more class periods, 1 field day.
T,S:H $5-10

2179. THE OCEAN: SOURCE OF NUTRITION, Project COAST, 104 Willard Hall, Education Building, University of Delaware, Newark, DE 19711.
Vo-tech; Unit. Four home economics lessons, each of which has teacher background for lecture, discussion questions, research and activities centered around marine foods and recipes. Some ingredients must be acquired at health food stores. The subject areas are: overview of marine plants, fish protein concentrate and aquaculture. 5 class periods.
T,S:H $0-5

2180. COASTAL FOREST ECOLOGY, 1981, Hillsborough County Public Schools, Instructional Services Center, 707 E. Columbus Drive, Tampa, FL 33602.
Botany, Ecology; Field Unit. Studies of pine flatwoods, mangrove swamp and coastal hardwood communities include background information, field trip instruction, follow-up data analysis and study questions. Although designed for upper Tampa Bay Park, it is easily adapted to other areas. 1-2 weeks. 73 pp.
T,S:H $0-5

Entries 2181-2185 comprise a "Glossary of Inlets" series that provides a summary of information in order to improve understanding of the effects of inlets on economics, recreation, water quality, and shoreline stability of surrounding areas. Topics include geology, vegetation, history, morphological changes, hydraulics, and sediments. Each contains a good list of references. They can be ordered from the Florida Sea Grant, G022 McCarty Hall, University of Florida, Gainesville, FL 32611. Geology, Social Studies, History; Reference. 45-85 pp.

2181. ST. LUCIE INLET

2182. FT. PIERCE INLET

2183. JOHN'S PASS AND BLIND PASS

2184. MATANZAS INLET

2185. PONCE DE LEON INLET

T,S:H,A $0-5

2186. SEA TURTLES AND THE TURTLE INDUSTRY OF THE WEST INDIES, FLORIDA AND THE GULF OF MEXICO, 1974, Thomas Rebel, University of Miami Press, Drawer 9088, Coral Gables, FL 33124.
Zoology, Social Studies; Reference. Description and life history of sea turtles are discussed. The turtle industry section gives a clear picture of the reason for the great population decline. 100 pages of bibliography. 250 pp.
T,S:H,A $10-20

2187. SEAFOOD PRODUCTS: FOOD SERVICE PROGRAM GUIDE, VPI-SG-79-04, Anita Webb et al.; Extension Division, Virginia Polytechnic Institute and State University, Blacksburg, VA 24061.
Vo-tech; Unit. Designed for occupational food students, this self-contained unit has nine lessons each with concepts, objectives, evaluation, text, transparency masters and activities. The unit covers nutrition, harvesting, storage, preparation, menus and cost analysis. 95 pp.
T,S:H,A $0-5
$5-10/with binder

2188. SEAFOOD PRODUCTS TEACHER RESOURCE GUIDE, 1981, Jacqueline Wheeler et al.; Extension Division, Virginia Polytechnic Institute and State University, Blacksburg, VA 24061.
Vo-tech; Unit. This is designed for use as practical seafood products teaching guide for home economics teachers, club leaders and extension agents. It is also a comprehensive source book for seafood retailers and laymen. Good transparency masters (entry 2062) accompany this program. 302 pp.
T,H:A $20-30

2189. WHERE LAND AND WATER MEET, National Ocean Industries Association, 1100 17th St., NW, Suite 410, Washington, D.C. 20036.
Social Studies; Reference. A limited use document that contains several points of view concerning coastal zone management in the context of offshore industries such as oil, shipbuilding, salvors, fishing and mining.
T,S:H,A $0-5

2190. OUR LIVING OCEANS, SECRETS OF THE SEA, 003-017-00486-4, National Marine Fisheries Service, Supt. of Documents, U.S. Government Printing Office, Washington, D.C. 20402.
Oceanography, History; Reference. Thumbnail sketch of history of ocean exploration and the practical value of marine research. The text is enhanced by good drawings. 8 pp.
T,S:H,A $0-5

2191. COASTAL ZONE MANAGEMENT KIT, League of Women Voters, 1730 M. St., 10th Floor, Washington, D.C. 20036.
Ecology, Social Studies; Reference. Six papers cover coastal zone management, the legislation, implementation, and some specific issues such as planning to prevent natural hazards, offshore oil, and hazardous wastes. 34 pp.
T,S:H,A $0-5

2192. THERMAL POLLUTION BY NUCLEAR POWER PLANTS, Project COAST, 104 Willard Hall, Education Building, University of Delaware, Newark, DE 19711.
Social Studies, Ecology; Unit. Inquiry process with student handouts and background information for the teacher leads the students to understanding thermal pollution in the marine environment. 1-2 class periods.
T,S:H $0-5

2193. SIMULATION GAME-SUPER-PORT, Project COAST, 104 Willard Hall, Education Building, University of Delaware, Newark, DE 19711.
Social Studies; Activity. Complete directions and materials are included for this game that concern an increasingly controversial subject. 12 class periods.
T,S:H $0-5

2194. LOCAL CONTROL OVER THE ON-SHORE IMPACTS OF OFFSHORE ENERGY DEVELOPMENT IN FLORIDA, R.D. Woodson, John Corbett; Marine Advisory Program, G022 McCarty Hall, University of Florida, Gainesville, FL 32611.
Social Studies; Reference. This is a brief study of the economic, environmental and social impacts of urban development generated by offshore energy development. Very interesting. 14 pp.
T,S:H,A $0-5

Entries 2195-2200 comprise a very good background series of papers that concerns various aspects of the offshore oil industry. The titles are self-explanatory. The series may be ordered from the Public Affairs Department, Exxon Corporation, 1251 Avenue of the Americas, New York, NY 10020.

Math, Social Studies, Vo-Tech; Reference. 15-30 pp.

2195. WORLD ENERGY OUTLOOK, EBS 12/79

2196. VERY LARGE CRUDE CARRIERS, EBS 11/75

2197. OFFSHORE SEARCH FOR OIL AND GAS, EBS 7/78

2198. REDUCING TANKER ACCIDENTS, EBS 59/73

2199. FATE AND EFFECTS OF OIL IN THE SEA, EBS 12/78

2200. THE FATE OF PETROLEUM IN THE MARINE ENVIRONMENT

T,S:A $0-5

2201. UNIVERSITY CURRICULA IN THE MARINE SCIENCES AND RELATED FIELDS: ACADEMIC YEARS 1979-80, 1980-81, Director, Office of Sea Grant, NOAA, 6010 Executive Blvd., Rockville, MD 20852.
Vo-tech; Reference. Latest information on colleges and universities that offer marine courses and degrees from two-year technology

curricula to Ph.D. degrees. Excellent resource for school guidance counselor. 285 pp.
T,S:H,A Free

2202. MARINE CAREER SERIES, 1980, URI-SG MM #41, Prentice Stout, ed.; Sea Grant, Woodward Hall, Kingston, RI 02881.
Vo-tech; Reference. Primer of job opportunities in scientific and professional fields. The broad scope descriptions make this a good resource for guidance counselors to lend to interested students. Sophisticated mathematical and physical analysis and theoretical models.
S:H Free

Entries 2203-2207 may be ordered from the Marine Advisory Program, G022 McCarty Hall, University of Florida, Gainesville, FL 32611.

2203. FLOATING TIRE BREAKWATERS, SUSF-SG-77-002, Charles Gifford, et al.
Vo-tech, Physics; References. Case study of low-cost shore, protection using scrap tire floating breakwaters. 13 pp.
T,S:H,A Free

2204. ARTIFICIAL REEFS IN FLORIDA, 1978, Donald Aska, ed.
Ecology, Social Studies; Reference. Conference proceedings to be used with entries 2205-2207 to form an informative unit on the where and why of artificial reefs. 75 pp.
T,S:H,A Free

2205. ARTIFICIAL REEF SITE SELECTION AND EVALUATION, 1979, Heyward Mathews.
Vo-tech; Reference. "How-To" booklet which covers physical location, depth vs. distance from shore, exact location by sextant or Loran permitting procedures and biological reporting. Use with entries 2204, 2206, and 2207.
T,S:H,A Free

2206. RECREATIONAL USE REEFS IN FLORIDA ARTIFICIAL AND NATURAL, 1979.
Social Studies; Reference. This map should be used with entries 2204, 2205, 2207 or may be used alone. More than 200 reefs are featured along with exact locations, depth and reef composition.
T,S:H,A Free

2207. CONSTRUCTING AN ARTIFICIAL REEF BUOY, 1979.
Vo-tech; Activity. Design specifications for construction of reef buoy. This activity stands alone or may be used as a part of a unit with entries 2204-2207. 4 pp.
T,S:H,A Free

GENERAL REFERENCE MATERIALS

3000. SEASHORES (A GOLDEN GUIDE), 1955, Herbert Zim and Lester Ingle; Western Publishing Company, 1220 Mound Avenue, Racine, WS 53404.
Biology; Identification Guide. A brief pictured key to seashore life followed by descriptive paragraphs and colored pictures of organisms and habitats. Fits into packet for convenient use in the field. 150 pp.
T,S:U,I,H,A $0-5

3001. SEASHELLS OF NORTH AMERICA, 1968, Tucker Abbott; Western Publishing Company, 1220 Mound Avenue, Racine, WS 53404.
Zoology; Identification Guide. Colored pictures accompanied by descriptive paragraphs of each species make this pocket-sized book an excellent field guide. There is also discussion on evolution, growth, reproduction, anatomy and ecology. 280 pp.
T,S:U,I,H,A $0-5

3002. THE MARINE AND FRESHWATER PLANKTON, 1955, Charles C. Davis; Michigan State University Press, 1405 S. Harrison Rd., East Lansing, MI 48382.
Biology; Identification Guide. Excellent resource. Not only are there extensive gross keys and line drawings, but also discussions of plankton ecology, adaptation, production, phyto-zooplankton, interrelationships, distribution, geographic and seasonal variations, and food. Comprehensive glossary and bibliography.
T,S:H,A $10-20

3003. WHAT'S THAT LITTLE THING IN THE WATER, 1977, Donald W. Humphreys; Xerox Publications, P.O. Box 2639, Columbus, OH 43216.
Biology; Lab. Good things can come in small packages. It teaches slide preparation, making plankton nets, using dichotomous keys, and has keys with excellent drawings of planktonic organisms. It is mostly fresh water, but is still extremely useful for general identification. 62 pp.
T,S:I,H $0-5

3004. PLANKTON OF THE ST. JOHN'S RIVER, Duval County Medical Center, 1347 Palmer St., Mayport, FL 32233.
Biology; Identification Guide. It has a scientific classification list and black and white illustrations of the common plankton. It is applicable statewide. It is another good supplement to marine biology unit. 46 pp.
T,S:I,H $0-5

3005. MARINE ALGAE OF THE WEST COAST OF FLORIDA, 1974, Clinton J. Dawes; University of Miami Press, Coral Gables, FL.

Botany; Identification Guide. If you're beyond an all-purpose "seashore life" identification book, then this is the next step. It has dichotomous keys, black and white drawings of some species, and detailed descriptions of almost 300 species. It also has names and descriptions of common higher plants grouped by habitat. It has a glossary and should be enough for most uses anywhere in Florida. 201 pp.
T,S:H,A $10-20

3006. HOW TO KNOW THE SEAWEEDS, 1978, Isabella Abbot, E. Yale Dawson; William C. Brown Company Publishers, 2460 Kerper Blvd, Dubuque, IA 52001.
Botany; Identification Guide. Spiral bound keys to conspicuous marine algae of the United States. Black and white drawings. It has sections on collecting and preserving, structure, life cycle and use of the day. This is a general reference and if specifics are needed, there is a list of regional marine algae identification books, including "Pictured Key to Nature." This series also has a book on "Marine Isopod Crustaceans." 150 pp.
T,S:H,A $5-10

3007. WETLANDS OF THE EASTERN UNITED STATES, 1977, North Atlantic Division Army Corps of Engineers, 90 Church St., New York, NY 10001.
Botany; Identification Guide. Plants are grouped by habitat, no key included. It has excellent color photos with paragraphs detailing location, description, and natural history of more than 350 species. That makes this a useful field guide to the Florida Wetlands. Printed in looseleaf form in order to allow incorporation of additional plant descriptions. 180 pp.
T,S:U,I,H,A $10-20

3008. TIDAL MARSH PLANTS, 1980, L.N. Eleutrius; Botany Section, Gulf Coast Research Laboratory, Ocean Springs, MS.
Botany; Identification Guide. Excellent handbook for field identification of 200 plants. It has line drawings along with descriptive paragraphs. Knowledge of botanical lingo is necessary. 128 pp.
T,S:H,A $10-20

3009. TIDAL WETLAND PLANTS OF VIRGINIA, Educational Series #19, Gene M. Silberhorn; Virginia Institute of Marine Science, Gloucester Point, VA.
Botany; Identification Guide. Simple key and vocabulary. It has two pages devoted to each of 43 common plants. The descriptions contain both the common and the scientific names, a short paragraph, and an excellent black and white drawing. It is very easy to use. 86 pp.
T,S:I,H,A $0-5

3010. GENERA OF THE EASTERN PLANTS, 1975, Wade T. Batson; University of South Carolina, John Wiley and Sons, Inc., 603 3rd Avenue, New York, NY 10016.
Botany; Identification Guide. Fits in hip pocket. This simple relatively inexpensive dichotomous key is useful for Florida plant identification. It has small print and very small line drawings of leaves and other

identifying characteristics. Knowledge of plant taxonomy is required. 203 pp.
T,S:H,A $10-20

3011. SEACOAST PLANTS OF THE CAROLINAS, 1973, Karl E. Graetz, UNC Sea Grant, 105 1911 Building, North Carolina State University, Raleigh, NC 27650.
Botany. Excellent information on how to plant beach plants and an understandable explanation of salt spray effect on plants. Identification is from black and white photos with descriptive paragraphs. This book is directed to people needing stabilization and salt tolerant landscape plants. 206 pp.
T,S:H,A $0-5

3012. A FIELD GUIDE TO THE ATLANTIC SEASHORE, 1979, Kenneth L. Gosner; Houghton Mifflin Company, 1 Beacon St., Boston, MA 02107.
Ecology; Field. It covers invertebrates and seaweeds. Ranging from the Bay of Fundy to Cape Hatteras, but many species are found in nothern Florida. Even if the species identification isn't exact, the student can get close enough for most applications. Organized as other books in Peterson field guide series with plates in the middle for ease in locating organism type. Also, has sections on collecting and preserving and general habitat descriptions. 329 pp.
T,S:H,A $10-20

3013. A FIELD GUIDE TO CORAL REEFS, 1982, Eugene H. Kaplan, Houghton Mifflin Company, 1 Beacon St., Boston, MA 01803.
Ecology; Field. Common invertebrates and species of fish indigenous to South Florida and the Caribbean. It has sections describing reef formations and reef geology. It is organized in the standard Peterson Field Guide manner--with plates in the center for ease in locating organism types. 289 pp.
T,S:I,H,A $10-20

3014. SEASHORE LIFE OF FLORIDA AND THE CARIBBEAN, 1976, Gilbert L. Voss; E.A. Seemann Publishing Company, Inc., Miami, FL
Biology; Identification Guide. Although primarily about the invertebrates most commonly found close to shore, it also has algae, seagrass and a few salt strand plants. This book is used by many south Florida teachers. There are a few color photographs but the drawings and written descriptions are most useful. It is not a key, but has been arranged by phylum. It has a glossary, reference list and minimal directions on collecting and preserving.
T,S:I,H,A $5-10

3015. BEACHCOMBER'S GUIDE TO GULF COAST MARINE LIFE, 1980, Nick Fotheringham; Lone Star Books, Division of Gold Publishing Company, P.O. Box 2608, Houston, TX 77001.
Biology; Identification Guide. Organisms are grouped by habitat for ease in locating while in the field. Black and white drawings aid in identification of the more commonly found organisms. 125 pp.
T,S:I,H,A $5-10

3016. FIELD GUIDE TO MARINE INVERTEBRATES, 1980, Jerry Greenberg et al.; Seahawk Press, 6840 S.W. 92nd St., Miami, FL 33156.
Zoology; Identification Guide, Field. this is a plastic card, 6" x 9" handy for carrying on field trips. Organisms are pictured in full color. It is good for stony coral and has a mere sampling of other invertebrates. Common names only are used.
T,S:U,I,H,A $0-5

3017. GUIDE TO CORALS AND FISHES (of Florida, the Bahamas, and the Caribbean), 1977, Idaz Greenberg; Seahawk Press (Banyan), 6840 S.W. 92nd St., Miami, FL 33156.
Zoology; Identification Guide. It is a paperback in full color with labeled drawings and a descriptive paragraph on each organism. There is a bit of natural history included in many of the descriptions. Besides fish and stony corals, it has sea turtles and a section on "Don't Touch" animals. It isn't a key, but is arranged by family. 64 pp.
T,S:U,I,H,A $0-5

3018. THE LIVING REEF, 1972, Jerry and Adaz Greenbag; Seahawk Press, 6840 S.W. 92nd St., Miami, FL 33156.
Zoology; Identification Guide. A potpourri of color photographs, mostly reef fish with a sprinkling of invertebrates; this book is mostly for browsing through and getting a flavor of reef life. Everything pictured is identified. There is some natural history and a 16-page section of fish identification. 110 pp.
T,S:U,I,H,A $5-10

3019. LIFE IN AND AROUND THE SALTMARSH, 1972, Michael J. Ursin; Thomas Y. Crowell Company, 10 E. 53rd, New York, NY 10032.
Ecology; Field. It has black and white drawings of organisms, size, text of distinguishing characteristics, geographic range map and a marsh zone map showing the organism's preferred habitat. It has marsh plants, some algae, common invertebrates, birds, reptiles, and mammals. There is a good explanation of marshes and human activity around marshes and a few colored photos. It is a useful single book for northern Florida but not good for South Florida. 100 pp.
T,S:U,I,H,A $0-5

3020. IDENTIFICATION MANUAL FOR COMMON ESTUARINE INVERTEBRATES OF THE LITTLE JETTIES, ST. JOHN'S RIVER, Patricia and Gary Kirkland; Duval County Marine Center, 1347 Palmer St., Mayport, FL 32233.
Zoology; Identification Guide. This simple key has short descriptive paragraphs, black and white line drawings and is applicable statewide. It is a good supplement to marine biology units. 19 pp.
T,S:I,H,A $0-5

3021. COMMON JELLYFISH AND COMB JELLIES OF NORTH CAROLINA, 1979, Frank J. Schwartz; 3047 Arendell St., Morehead City, NC 28557.
Zoology; Identification Guide. This booklet contains short descriptions and line drawings of eleven common jellies most of which are found in Florida waters. Notes on classification, predators and symbiotes, along with first aid, are included, plus suggested additional reading. 21 pp.
T,S:I,H $0-5

3022. SEASHELLS OF NORTH AMERICA, R. Tucker Abbot; Western Publishing Company, 1220 Mound Avenue, Racine, WI 53404.
Zoology; Identification Guide. It has good color drawings, a good section on natural history, as well as current nomenclature. Also, there are sections on collecting, preserving, cataloguing, and keeping mollusks in aquaria. If a shell is not identified in the book, refer to Abbot's hardback or publications specializing in certain families.
T,S:I,H,A $5-10

3023. SEASHELLS COMMON TO NORTH CAROLINA, 1981, Hugh J. Porter, North Carolina Department of Natural Resources, c/o Marine Resources Center, Pine Knoll Shores, P.O. Box 580, Atlantic Beach, NC 28512.
Zoology; Identification Guide. More than 200 species are included most of which are found in Florida waters. It has a key with monochromatic photographs and line drawings. Some familiarity with mollusk anatomy is necessary. It is a good teaching tool in the use of a dichotomous key. 36 pp.
T,S:H,A $0-5

3024. FISHES OF THE ATLANTIC COAST, 1976, Gar Goodson; Marquest Colorguide Books, P.O. Box 132, Palos Verdes Estates, CA 90274.
Zoology; Identification Guide. This pocket book not only has full color pictures and descriptions of 400 fish, but also has extensive natural history information on the various families. Information grouped by family. It includes maps and names for each fish. 203 pp.
T,S:U,I,H,A $0-5

3025. FISHES OF THE GULF OF MEXICO, 1977, H. Dickson Hoese, Richard Moore, Texas A&M University Press, College State, TX.
Zoology; Identification Guide. 500 species of fish are described using over 600 photographs and drawings, many of which are outstanding underwater color plats. There are easy to follow keys to families and species. Descriptive paragraphs include identifying characteristics, abundance, importance, habitat, range and maximum size. Introductory section outlines ecology and zoogeography of the Gulf and a short review of conservation efforts applicable to all Florida waters. 327 pp.
T,S:H,A $10-20

3026. FISH WATCHER' FIELD GUIDE, 1979, Jerry Greenberg, et al; Seahawk Press, 6848 S.W. 92nd St., Miami, FL 33156.
Zoology; Identification Guide, Field. A plastic card, 6" x 9", in full color and handy for carrying on field trips. It includes subtropical reef fish such as snapper, grunts, rays and groupers with common names only.
T,S:U,I,H,A $0-5

3027. FISH WATCHER'S GUIDE, 1972, C.G. Chaplain; Harrowood Books, 3943 N. Providence Rd., Newton Square, PA 19073.
Zoology; Identification Guide. Identification of reef fish with good color drawings, common and scientific names plus some descriptive and life history information. Fish are grouped by families. The book also provides small sections on stony coral identification and first aid

precautions for various "stings". This book can be obtained in paperback or in waterproof form. 64 pp.
T,S:U,I,H,A $5-10

3028. GUIDE TO COASTAL FISHES OF GEORGIA AND NEARBY STATES, 1975, Michael D. Dahlberg; University of Georgia Press, Athens, GA 30602.
Zoology; Identification Guide. It includes a dichotomous key and descriptive paragraphs denoting key characters, range, and habitat for each species. There is also a section describing the aquatic habitats of Georgia which are pertinent to Florida. A glossary and comprehensive reference list is included. 187 pp.
T,S:H,A $5-10

3029. KEY TO THE ESTUARINE AND MARINE FISH OF TEXAS, 1972, edited by Jack C. Parker; Texas A&M University, College Station, TX.
Zoology; Identification Guide. This book is not intended to be all-inclusive, but it does contain 124 families of fish and identifies species with a dichotomous key. It has good line drawings of many species, instructions on the use, a glossary, drawings of diagnostic characteristics and a bibliography. This book is applicable to Florida. 185 pp.
T,S:I,H,A $0-10

3030. MARINE FISHES COMMON TO NORTH CAROLINA, 1972, Frank J. Schwartz; North Carolina Department of Natural and Economic Resources, c/o Pine Knoll Shores, P.O. Box 580, Atlantic Beach, NC 28512.
Zoology; Identification Guide. More than 80 species are included plus brief descriptive paragraphs, intricate black and white drawings with identifying characteristics pinpointed, and notes on edibility. This makes it an easy-to-use informative guide that is applicable to Florida. 32 pp.
T,S:U,I,H $0-5

3031. FISH IDENTIFICATION MANUAL, Duval County Marine Center, 1347 Palmer St., Mayport, FL 32233.
Zoology; Identification Guide. This book, with black and white line drawings and simple, very abbreviated descriptions of common Florida fish, is a useful supplement to marine biology units. 8 pp.
T,S:U,I,H $0-5

3032. SHARKS AND OTHER DANGEROUS SEA CREATURES, 1981, Jerry Greenberg; Seahawk Press, 6840 S.W. 92nd St., Miami, FL 33156.
Zoology; Identification Guide. A paperback of color photographs and color drawings with enough information for the casual student. There is a sprinkling of photographs and information on such things as fire coral, bristle, worms, and eels. 64 pp.
T,S:U,I,H,A $0-10

3033. SHARKS OF NORTH CAROLINA AND ADJACENT WATERS, 1975, Frank J. Schwartz; 3407 Arendall St., Morehead City, NC 28557.
Zoology; Identification Guide. The guide is composed of short descriptions and line drawings of 39 sharks, most of which are found in Florida

waters. Also included is a dichotomous key, glossary, and comprehensive bibliography. 59 pp.
T,S:I,H $0-5

3034. FLORIDA MANATEE, AN EDUCATOR'S GUIDE, 1980, Debbie Fritz; Florida Department of Natural Resources, Office of Education and Information, 3900 Commonwealth Blvd., Tallahassee, FL 32303.
Zoology. The text includes natural history, protective laws and enforcement and maps of manatee sanctuaries. Vocabulary, comprehensive bibliography and 22 innovative and simple multidisplinary activity suggestions are also included. 64 pp.
T:I,H Free

3035. WHALES AND DOLPHINS, 1976, E.G. Slyper; University of Michigan, 839 Green St., Ann Arbor, MI 48106.
Zoology. A scientific book concerning the biology and behavior of dolphins and whales. Also included are the physics of swimming, circulation, reproduction, digestion, metabolism, distribution, and migration. It is well written and contains good black and white photographs and drawings. 169 pp.
T,S:H,A $5-10

3036. WHALES INFORMATION PACKET, Center for Environmental Education, Educational Materials, 1925 K St., NW, Suite 206, Washington, D.C. 20006.
Zoology. Fourteen species of whales are detailed with an extra page--"What you can do" to stop commercial killing of whales. 17 separate pages in a folder with vocabulary on frontispiece.
T,S:U,I $0-5

3037. SEALS INFORMATION PACKET, Center for Environmental Education, Educational Materials, 1925 K St., NW, Suite 206, Washington, D.C. 20006.
Zoology. Two pages of general information on the anatomy of seals is followed by separate fact sheets on fourteen species of seal. Each sheet includes a picture of the animal, a descriptive paragraph, scientific name, physical characteristics, range, feeding, comments on life history and population status. The vocabulary is on frontispiece. 15 separate pages in a folder.
T,S:I,H $0-5

3038. DANGEROUS MARINE ANIMALS, 1959, B.W. Halstead; Cornell Maritime Press, Inc., P.O. Box 459, Centreville, MD 21617.
Zoology. It has been recognized by many as the best reference of its kind. Comprehensive worldwide text including identification distribution, habitats, noxious characteristics, and first aid is contained in the book. Black and white and color photographs and line drawings are also included. 220 pp.
T,S:I,H,A $5-10

3039. HOW TO COPE WITH DANGEROUS SEA LIFE, 1977, Edwin S. Iverson, Ranate H, Skinner; Windward Publishing, Inc., P.O. Box 371005, Miami, FL 33137.

Zoology. This book offers good coverage of common Florida animals. Color photographs of each animal are accompanied by information on habitat, what kind of danger each animal presents, prevention, and remedy. Chapters on animals that bite, sting or are poisonous to eat are included. It also includes mention of red tide and "swimmer's itch." It also has a general chapter on treatment for bites, stings, or seafood poisoning. 64 pp.
T,S:I,H,A $0-5

3040. SEAWORLD FACT SHEETS, Sea World, 7007 Sea World Dr., Orlando, FL 32809.
Zoology. Fact sheets should be requested by individual titles:
Killer Whale Fact Sheet, 8 pp.
Bottle-nose Dolphin Fact Sheet, 9 pp.
Walrus Fact Sheet, 12 pp.
Seal Fact Sheet, 2 pp.
Sharks, 4 pp.
Manatee Fact Sheet, 2 pp.
Whale Packet, 12 pp.
Caribbean Tidepool, 1 p.
Coral Reefs, 3 pp.
Echolocation in Cetacea, 2 pp.
Training of Marine Mammals, 2 pp.
Maintaining Water Quality in Closed Systems, 7 pp.
T,S:I,H $0-5

3041. MARINE EDUCATION LEAFLETS, 1976, Marine Education Center, Gulf Coast Research Lab, Biloxi, MS.
Zoology. Organisms leaflets. This is a series of informative leaflets, each one on a specific subject such as "squid", "seagrasses", "toxic marine animals", etc. These contain excellent supplementary information for a student to use in the classroom or for individual research. Envelop of several pieces.
T,S:I,H,A $0-5

3042. KEEPING A MARINE AQUARIUM: A MANUAL, Christopher Valenti; Sea Grant Program, University of Delaware, 104 Willard Hall, Education Building, Newark, DE 19711.
Biology. This manual has clear instructions, drawings and black and white photographs. There are chapters on collecting and on maintenance and trouble-shooting along with a sample maintenance checklist suitable for use with a class.
T,S:I,H,A $0-5

3043. MARINE AQUARIUM KEEPING THE SCIENCE, ANIMALS AND ART, 1973, Stephen Spotte; John Wiley and Sons, Inc., 605 3rd Avenue, New York, NY 10016.
Biology. This book is the next step beyond the beginner's booklet found in pet shops or in many marine education units. It is an excellent reference for aquarist having substantial background information. Boxed "cook book" directions for dealing with specific topics, such as "How to Feed a Filter Feeder," "How to Treat Lymphocystic" is also

included. Beyond this book would be references on specific organism types or virtual encyclopedias of information. 171 pp.
T,S:H,A $10-20

3044. BALANCED MARINE AQUARIUM AND THE BIOLOGY OF MARINE AQUARIUM FISHES COLLECTED IN MONROE COUNTY, FLORIDA, 1981, Barbara Palk; Panama City Lab NMFS, 3500 Selwood Reach Rd., Panama City, FL 32407.
Biology. The narrative on aquarium care is clear, in sensible order and enhanced by examples. The plus in this booklet is the extensive information on tropical reef fishes, especially suitability for and behavior in an aquarium.
T,S:I,H,A $0-5

3045. SO YOU WANT TO KEEP A MARINE AQUARIUM, Jeff Hallett; Duval County Marine Center, 1347 Palmer St., Mayport, FL 32233.
Biology. A "how to" booklet.
T,S:I,H $0-5

3046. STARTING AND MAINTAINING A MARINE AQUARIUM, 4-H Members Guide and Record Book, 1980, Florida Cooperative Extension Service, Institute of Foods and Agricultural Sciences, University of Florida, Gainesville, FL 32611.
Biology. This was written for the student to read and follow with clarifying illustrations. It is complete and easy to follow and has suggested, hardy Florida reef fish. The accompanying aquarium Project Record is an excellent student guide for maintaining an aquarium.
T,S:I,H $0-5

3047. WORLD (PHYSICAL/OCEAN FLOOR), 1981, National Geographic Society, 17th and M Sts., NW, Washington, D.C.
Physics. On plasticized paper and in color, this is a relief map showing features of land masses, but particularly of oceanic trenches, mountains, ridge zones, etc. This is an excellent display of the complexity of the ocean floor and it makes plate tectonics easier to grasp.
T,S:U,I,H,A $0-5

3048. POSTERS: MARINE FISHES OF THE GULF AND SOUTH ATLANTIC 003-020-00065-7; MOLLUSKS AND CRUSTACEANS OF THE COAST, U.S. 003-020-0057-8; MARINE MAMMALS OF THE WESTERN HEMISPHERE 003-020-00106-8. National Marine Fisheries Service, Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402.
Biology. Colorful and accurate, these posters not only enliven a room, but can be used as tools in identification, taxonomy, and discussions of similarities and differences.
T,S:U,I,H,A $5-10

3049. SOUNDS AND SONGS OF THE SEA, National Geographic Society, 17th and M Sts., N.W. Washington, D.C. 20036.
Music, History. This record of chanties was made on board a schooner so even the background sounds are authentic. The record jacket has several pages of background on clipper ships, sailing and each song.

There are fine color photographs to give students the flavor of sailing ships. This includes maps of the clipper ship routes and a large labeled drawing of a clipper. 23 songs.
T,S:P,U,I,H,A $5-10

3050. FOC'SLE SONGS AND CHANTIES, Folkways Records and Service Corporation, 43 W. 61st St., New York City, NY 10023.
Music, History, Social Studies. A record of delightful and historically significant sea chanties with words written in separate booklets for "singing along". These are wonderful attention getters in music, history and social studies.
T,S:P,U,I,H,A $5-10

3051. NAUTICAL CHART CATALOG (United States Atlantic and Gulf Coasts) National Ocean Survey, NOAA, Distribution Division (OA/C44), Riverdale, MD 20737.
Vo-tech. This is actually a graphic bibliography of nautical charts of various types, including navigation, current tables, and tidal current charts which are useful classroom visual aids. Many of these items are available at local marine supply outlets. The small craft charts help the students visualize their immediate area.
T,S:I,H,A $0-5

3052. INTERNATIONAL FLAGS AND PENNANTS, Insurance Company of North America, 1600 Arch St., Philadelphia, PA 19101.
Vo-tech. This is a pamphlet in full color showing signal flags international alphabet, numeral flags, list of single letter signals and some of the aid to navigation buoys. It is good for use in connection with history lessons or communications without sound. Students may make their own flags, leave messages, instructions, name tags, etc.
T,S:P,U,I,H,A $0-5

3053. THE ART OF KNOTS: A SAILOR'S HANDBOOK, 1977, M.P. Birthnier; Doubleday and Company, Inc., 245 Park Avenue, New York, NY 10017.
Vo-tech; Activity. This book not only shows how to tie both useful and decorative knots, but also tells about their uses and eccentricities, often with amusing sides. Diagrams of tying procedures are sometimes enhanced by a delightful sketch. 187 pp.
T,S:U,H,A $5-10

3054. CAST NETS, MAKING AND MENDING THEM, 1968, Ted Dahlem; Great Outdoors Publishing Company, 4747 28th St., N., St. Petersburg, FL 33714.
Vo-tech. The title is self-explanatory. Simple text with excellent diagrams make this a fine resource for all ages. Chapters on how to catch the mullet and how to throw a cast net are included.
T,S:I,H,A $0-5

3055. PLANNING AND CUTTING NETS, 1972, Albert T. Hillier; Marine Series Number 8, University of Rhode Island, Murragansett, RI 02882.
Vo-tech, Math. For general use, this booklet needs to be used with pictures of commercial fishing nets so the student knows what the end result would be. Making a model net (using nylon net fabric) would be a

good activity with a unit on marine resources, as a practical application of math or in a vocational-technical class. 12 pp.
T,S:H,A $0-5

3056. FIELD STUDIES PLANNING GUIDE, Lee County Environmental Education Center, 2055 Central Avenue, Ft. Myers, FL 33901.
Ecology; Field. As the title implies, this is a planning guide for field trips, but it is more than that. It describes 6 conceptual schemes central to Lee County's Environmental Education program. It also describes field trip sites in Lee County, suggested progression of field work by grade level and a list of field guides and booklets available from Lee County. 50 pp.
T,S:P,U,I,H $0-5

3057. HURRICANES OF THE TEXAS COAST, 1980, Walter K. Henry et al.; Center for Applied Geosciences, College of Geosciences, Texas A&M University, College Station, TX 74843.
Oceanography. Although Texas oriented the description, climatology and safety precautions pertain to Florida.
T,S:H,A Free

3058. WATER SAFETY AND YOU, Susan Bonsall; New Jersey Marine Advisory Service, Rutger's Univresity, New Jersey Marine Sciences Consortium.
Multidisciplinary. Selected radio scripts. Included are many aspects of boating, diving and safety in short, well-written essays. This is pertinent to drama and vo-tech classes.
T,S:U,H,A Free

3059. BASIC BOATING, U.S. Coast Guard Auxiliary, National Board, Inc., Washington, D.C.
Vo-tech. This instruction manual is designed to be used with U.S. Coast Guard Auxiliary boating course, but can be used independently in vo-tech and social studies classes. Easy language, chapter self-tests, good black and white photographs and line drawings are included. Includes trailer boating, navigation, maneuvering, rules of the road, and legal requirements. 52 pp.
T,S:I,H,A $0-5

3060. THE NOAA DIVING MANUAL, J. Miller, ed.; 1975, Manned Undersea Sciences and Technology Office, National Oceanic and Atmospheric Administration, Superintendent of Documents, Washington, D.C. 20402.
Vo-tech. It discusses gas laws, an application most students appreciate. There is good coverage, (photographs and drawings) of current equipment, technology of manned undersea exploration. It also provides excellent contrast for adaptations of marine animals. It has much more valuable information than usual basic dive manuals. 390 pp.
T,S:I,H,A $10-20

LIBRARY MATERIALS

4000. ATLAS OF THE OCEANS, 1977, Rand McNally and Company, Box 7600, Chicago, IL 60608.

4001. THE SALTWATER AQUARIUM IN THE HOME, 1976, Robert P.L. Straughan; A.S. Barnes and Company, Box 421, Cranbury, NJ 08512.

4002. WORLD BENEATH THE SEA, 1973, National Geographic Society, 17th and M St., NW, Washington, D.C. 20036.

4003. UNDERSEA TREASURES, 1973, National Geographic Society, 17th and M St., NW, Washington, D.C 20036.

4004. THE UNDERSEA, 1977, N.C. Fleming, General Editor; MacMillan Publishing Co., Inc., 866 3rd Avenue, New York, NY 10016.

4005. THE OCEAN WORLD OF JACQUES COUSTEAU, 20 Volumes, Danbury Press, Sherman Turnpike, Canburg, CT 06816.

4006. THE COUSTEAU ALMANAC: AN INVENTORY OF LIFE ON OUR WATER PLANET, Jacques Cousteau and the Cousteau Society; Doubleday and Co., 501 Franklin Avenue, Garden City, NY 11530.

4007. AQUACULTURE, 1972, John E. Bardach, et al.; Wiley-Interscience, 605 3rd Avenue, New York, NY 10016.

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TEACHER-PRODUCED MATERIALS

The following packets, grouped by general subject, applications and grade level, are comprised of materials devised by teachers and have been successfully tested in the classroom. If the name of the author is known, the document is credited accordingly. Packets are stored in the Marine Education Resources Center, 2335 Norman Hall, College of Education, University of Florida, Gainesville, Florida 32611. Contact Dr. Koran regarding availability of materials.

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5. The Living Sea: A learning package about mollusk, crustaceans, and sea creatures.

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6. Laboratory Study of the Squid
7. Porifera
8. Phylum Cridaria
9. Echinodermata
10. Mollusca
11. Arthropoda
12. The Floating Population of the Ocean
13. Common Phyla Represented in Plankton Samples
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6. A Case for Mangroves
7. The Mangrove Ecosystem
8. The Production of Organic Detritus in a South Florida Estuary
9. Pathways of Energy Flow in a South Florida Estuary
10. Suggested Mangrove Transplanting Techniques
11. The Marine Center Book
12. Seagrass Flats
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12. Sand
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2. Mullet Key Field Guide
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4. Juncus-Spartina Energy System
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6. Field Guide to Marsh and Hammock
7. A Field Guide to the Spoilbanks
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9. Grass Flat Field Trip
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11. Projects for Secondary Students
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13. Common Bay Scallop
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18. Portuguese Man-of-War
19. Coquina
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24. Mollusca (2 different)
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11. Sharks
12. Whales, Dolphins, and Porpoises: Bibliography
13. Seals, Sea Lions, and Walruses: Marine Mammals - General; Fishes; Manatees: Bibliography
14. Killer Whale Fact Sheet
15. Bottenose Dolphin Fact Sheet
16. Echolocation in Cetacea
17. Seal Feeder Fact Sheet
18. Walrus Fact Sheet
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20. Sandy Shore and Dunes
21. Tidal Flats
22. Rocky and Man-made Shores
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24. Our Seashore Life
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9. Phylum Echinodermata
10. Phylum Annelida
11. Phylum Arthropoda, Class Crustacea
12. Phylum Mollusca, Class Pelecypoda
13. The Squid, Creature with a Giant Nerve
14. Class Cephalopoda
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16. Sharks
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42. Particle Movement in Waves
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Duval County Marine Center, MARINE SCIENCE FOR FOURTH GRADE, #1063
Duval County Marine Center, MARINE SCIENCE FOR SECOND GRADE, #1007
Duval County Marine Center, MARINE SCIENCE FOR THIRD GRADE, #1008
Duval County Marine Center, STANDARD CHEMICAL ANALYSIS, #2113
Duval County Marine Center, PLANKTON OF THE ST. JOHN'S RIVER, #3004

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Engine-Uity, Literature of the Sea-Porta Centers, 1980, CALL IT COURAGE, #1154
Engine-Uity, Literature of the Sea-Porta Centers, 1980, CARRY ON, MR. BOWDITCH, #1155
Engine-Uity, Literature of the Sea-Porta Centers, 1980, ISLAND OF THE BLUE DOLPHINS, #1153
Engine-Uity, Literature of the Sea-Porta Centers, 1980, KON TIKI, #1157
Engine-Uity, Literature of the Sea-Porta Centers, 1980, MOBY DICK, #1158
Engine-Uity, Literature of the Sea-Porta Centers, 1980, 20,000 LEAGUES UNDER THE SEA, #1156

Engine-Uity, Literature of the Sea-Porta Centers, 1980, TYPHOON, #1162
Engine-Uity, Literature of the Sea-Porta Centers, 1980, MUTINY ON THE BOUNTY, #1159
Engine-Uity, Literature of the Sea-Porta Centers, 1980, ALGAE, #1110
Engine-Uity, Literature of the Sea-Porta Centers, 1980, BIVALVES, #1102
Engine-Uity, Literature of the Sea-Porta Centers, 1980, CORALS, #1114
Engine-Uity, Literature of the Sea-Porta Centers, 1980, CRUSTACEANS, #1113
Engine-Uity, Literature of the Sea-Porta Centers, 1980, DOLPHINS, #1100
Engine-Uity, Literature of the Sea-Porta Centers, 1980, ENDANGERED SPECIES, #1117
Engine-Uity, Literature of the Sea-Porta Centers, 1980, GEOLOGY, #1107
Engine-Uity, Literature of the Sea-Porta Centers, 1980, INSTRUMENTS, #1106
Engine-Uity, Literature of the Sea-Porta Centers, 1980, MIRCORSCOPES, #1109
Engine-Uity, Literature of the Sea-Porta Centers, 1980, OCTOPUSES, #1112
Engine-Uity, Literature of the Sea-Porta Centers, 1980, PELICANS, #1104
Engine-Uity, Literature of the Sea-Porta Centers, 1980, PENGUINS, #1105
Engine-Uity, Literature of the Sea-Porta Centers, 1980, PLANKTON, #1111
Engine-Uity, Literature of the Sea-Porta Centers, 1980, POLLUTION, #1115
Engine-Uity, Literature of the Sea-Porta Centers, 1980, PRODUCTS FROM THE SEA, #1116
Engine-Uity, Literature of the Sea-Porta Centers, 1980, SEALS, #1099
Engine-Uity, Literature of the Sea-Porta Centers, 1980, STARFISH, #1103
Engine-Uity, Literature of the Sea-Porta Centers, 1980, UNIVALVES, #1101
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CURRICULUM AREA INDEX

ART

1058, 1059, 1060, 1061, 1068, 1121, 1122, 1152

BIOLOGY

1061, 1073, 1111, 1117, 1120, 1121, 1129, 2017, 2024, 2025, 2027, 2055, 2056, 2130, 2131, 2132, 2137, 2148, 2160, 2164, 2169, 2171, 2175, 3000, 3002, 3003, 3004, 3014, 3015, 3042, 3043, 3044, 3045, 3046, 3048

BOTANY

1082, 1110, 2047, 2048, 2096, 2155, 2156, 2157, 2158, 2159, 2178, 2180, 3005, 3006, 3007, 3008, 3009, 3010, 3011

CHEMISTRY

2043, 2044, 2112, 2113, 2116, 2176, 2177

ECOLOGY

1000, 1001, 1003, 1004, 1008, 1015, 1017, 1019, 1021, 1022, 1023, 1024, 1025, 1027, 1028, 1062, 1066, 1078, 1081, 1087, 1132, 1133, 1135, 1140, 2011, 2014, 2015, 2016, 2022, 2023, 2031, 2033, 2034, 2046, 2049, 2052, 2053, 2057, 2058, 2061, 2063, 2064, 2065, 2066, 2067, 2068, 2070, 2072, 2073, 2134, 2135, 2136, 2139, 2140, 2141, 2142, 2143, 2144, 2145, 2146, 2167, 2174, 2180, 2191, 2192, 2204, 3012, 3013, 3019, 3056

GEOLOGY

1010, 1039, 1041, 1107, 1136, 1137, 1139, 2051, 2071, 2075, 2076, 2106, 2106, 2118, 2121, 2122, 2123, 2124, 2125, 2126, 2127, 2128, 2129, 2181, 2182, 2183, 2184, 2185

HISTORY

1040, 1124, 1125, 1145, 1147, 1150, 1151, 1171, 2078, 2079, 2080, 2081, 2082, 2083, 2084, 2085, 2086, 2181, 2182, 2183, 2184, 2185, 2190, 3049, 3050

LANGUAGE ARTS

1011, 1030, 1039, 1047, 1052, 1053, 1054, 1055, 1056, 1057, 1069, 1083, 1091, 1097, 1098, 1099, 1100, 1101, 1102, 1103, 1104, 1105, 1106, 1107, 1108, 1109, 1110, 1111, 1112, 1113, 1114, 1115, 1116, 1117, 1119, 1149, 1153, 1154, 1155,

1156, 1157, 1158, 1159, 1160, 1161, 1162, 1163, 1164, 1165, 1166, 1167, 1168, 1169, 1170, 1171, 1172, 1173, 1174, 2053, 2089, 2091, 2092, 2093, 2098, 2099, 2137, 2138, 2148, 2149

MATH

1144, 1145, 1146, 2029, 2074, 2077, 2195, 2196, 2197, 2198, 2199, 2200, 3055

MUSIC

1000, 3049, 3050

MULTIDISCIPLINARY

1005, 1009, 1010, 1020, 1049, 1067, 1075, 1077, 1079, 1143, 1148, 2013, 2018, 2019, 2020, 2035, 2087, 2110, 3058

OCEANOGRAPHY

1007, 1014, 1029, 1060, 1063, 1064, 1065, 1069, 1080, 1097, 1106, 1115, 1124, 1125, 1130, 1134, 1141, 2000, 2001, 2002, 2003, 2004, 2005, 2006, 2007, 2008, 2009, 2010, 2026, 2028, 2030, 2038, 2054, 2100, 2101, 2102, 2103, 2104, 2105, 2106, 2107, 2108, 2109, 2111, 2170, 2173, 2190, 3057

PHYSICS

1044, 1108, 2021, 2029, 2039, 2040, 2041, 2042, 2095, 2114, 2115, 2119, 2203, 3047

SOCIAL STUDIES

1000, 1042, 1043, 1045, 1046, 1048, 1049, 1050, 1051, 1069, 1083, 1149, 1168, 2012, 2016, 2028, 2038, 2053, 2059, 2060, 2061, 2069, 2077, 2078, 2079, 2088, 2091, 2094, 2095, 2096, 2097, 2098, 2099, 2117, 2135, 2139, 2143, 2144, 2145, 2181, 2182, 2183, 2184, 2185, 2186, 2189, 2191, 2192, 2193, 2194, 2195, 2196, 2197, 2198, 2199, 2200, 2204, 2206, 3050

SPECIAL EDUCATION

1035

VO-TECH

1042, 1109, 1116, 1123, 1126, 1127, 1147, 1148, 2012, 2026, 2037, 2062, 2090, 2099, 2120, 2179, 2187, 2188, 2195, 2196, 2197, 2198, 2199, 2200, 2201, 2202, 2203, 2205, 2207, 3051, 3052, 3053, 3054, 3055, 3059, 3060

ZOOLOGY

1002, 1005, 1006, 1009, 1011, 1012, 1013, 1016, 1018, 1026, 1031, 1032, 1033, 1034, 1036, 1037, 1038, 1059, 1070, 1071, 1072, 1074, 1075, 1076, 1084, 1085, 1086, 1088, 1089, 1090, 1092, 1093, 1094, 1095, 1096, 1098, 1099, 1100, 1101, 1102, 1103, 1104, 1105, 1111, 1112, 1113, 1114, 1118, 1119, 1122, 1128, 1131,

1135, 1142, 2032, 2036, 2037, 2045, 2050, 2098, 2133, 2142, 2146, 2149, 2150, 2151, 2152, 2153, 2154, 2161, 2162, 2163, 2165, 2166, 2168, 2172, 2186, 3001, 3016, 3017, 3018, 3020, 3021, 3022, 3023, 3024, 3025, 3026, 3027, 3028, 3029, 3030, 3031, 3032, 3033, 3034, 3035, 3036, 3037, 3038, 3039, 3040, 3041

APPLICATION INDEX

ACTIVITY

1000, 1002, 1003, 1004, 1025, 1026, 1027, 1044, 1049, 1052, 1053, 1054, 1058, 1059, 1060, 1061, 1067, 1068, 1069, 1075, 1097, 1098, 1099, 1100, 1101, 1102, 1103, 1104, 1105, 1106, 1107, 1108, 1109, 1110, 1111, 1112, 1113, 1114, 1115, 1116, 1117, 1120, 1121, 1122, 1126, 1144, 1145, 1147, 1153, 1154, 1155, 1156, 1157, 1158, 1159, 1160, 1161, 1162, 1173, 2003, 2007, 2013, 2026, 2037, 2053, 2054, 2060, 2061, 2062, 2066, 2077, 2120, 2193, 2207, 3053

FIELD

1020, 1021, 1022, 1023, 1024, 1027, 1028, 1065, 1066, 1128, 1129, 1130, 1131, 1132, 1133, 1134, 1135, 1136, 1137, 1138, 1139, 1141, 1142, 2065, 2066, 2067, 2068, 2070, 2071, 2072, 2072, 2075, 2076, 2115, 2158, 2166, 2168, 2169, 2171, 2173, 2174, 2178, 2180, 3012, 3013, 3016, 3019, 3026, 3056

LAB

1118, 1119, 2054, 2055, 2056, 2057, 2113, 2115, 2169, 2170, 2171, 2172, 2173, 2174, 2175, 2176, 2177, 3003

IDENTIFICATION GUIDE

1074, 1093, 1094, 2124, 2125, 2126, 2159, 2160, 2161, 2162, 3000, 3001, 3002, 3004, 3005, 3006, 3007, 3008, 3009, 3010, 3014, 3015, 3016, 3017, 3018, 3020, 3021, 3022, 3023, 3024, 3025, 3026, 3027, 3028, 3029, 3030, 3031, 3032, 3033

READING

1000, 1031, 1034, 1035, 1036, 1037, 1038, 1039, 1043, 1047, 1053, 1055, 1056, 1057, 1059, 1071, 1072, 1077, 1163, 1164, 1165, 1166, 1167, 1168, 1169, 1170, 1171, 1172, 1174, 2089, 2092, 2093, 2099, 2137, 2138

REFERENCE

1001, 1029, 1031, 1032, 1033, 1034, 1040, 1041, 1042, 1043, 1046, 1048, 1052, 1073, 1075, 1076, 1078, 1079, 1092, 1095, 1096, 1123, 1124, 1125, 1135, 1136, 1137, 1138, 1139, 1149, 1150, 1151, 1152, 2000, 2023, 2025, 2058, 2059, 2080, 2081, 2082, 2083, 2084, 2085, 2086, 2087, 2090, 2098, 2106, 2107, 2108, 2109, 2111, 2118, 2119, 2122, 2123, 2127, 2135, 2136, 2137, 2138, 2139, 2140, 2141, 2142, 2143, 2144, 2145, 2146, 2148, 2149, 2150, 2151, 2152, 2153, 2154, 2155, 2156, 2157, 2158, 2160, 2161, 2162, 2163, 2164, 2165, 2166, 2167, 2168, 2181, 2182, 2183, 2184, 2185, 2186, 2189, 2190, 2191, 2194, 2195, 2196, 2197, 2198, 2199, 2200, 2201, 2202, 2203, 2204, 2205, 2206

TEXT

1014, 1062, 1070, 1080, 1140, 1141, 2006, 2014, 2015, 2027, 2031, 2032, 2037, 2110, 2121, 2122, 2123, 2127, 2128, 2129, 2132, 2134

TEXTBOOK

2001, 2002, 2004, 2005, 2008, 2009, 2017, 2100, 2101, 2102, 2103, 2104, 2105, 2130, 2131

UNIT

1001, 1002, 1003, 1004, 1005, 1006, 1007, 1009, 1009, 1010, 1011, 1012, 1013, 1015, 1016, 1017, 1018, 1019, 1021, 1022, 1023, 1024, 1030, 1045, 1050, 1051, 1063, 1064, 1065, 1066, 1070, 1081, 1082, 1083, 1084, 1085, 1086, 1087 1088, 1089, 1090, 1091, 1127, 1132, 1143, 1146, 1148, 2010, 2011, 2012, 2016, 2018, 2019, 2020, 2021, 2022, 2024, 2028, 2029, 2030, 2033, 2034, 2035, 2036, 2038, 2039, 2040, 2041, 2042, 2043, 2044, 2045, 2046, 2047, 2048, 2049, 2050, 2051, 2052, 2063, 2064, 2069, 2074, 2077, 2078, 2079, 2088, 2091, 2094, 2095, 2096, 2097, 2112, 2113, 2114, 2115, 2116, 2117, 2133, 2177, 2179, 2180, 2187, 2188, 2192

APPENDICES

SUGGESTED SPIRAL CURRICULUM FOR SCIENCE

The purpose of this spiral curriculum is to prompt teachers to include the coastal zone, the oceans, and marine life when they are working in almost any science unit. The topics suggested at various grade levels are covered in most science texts for that grade level and also are found in unified curriculum objectives of several Florida school districts.

Although this curriculum includes only a sampling of many possible marine education suggestions, it can be very helpful in instilling, even at an early age, the knowledge of and respect for our marine environment.

Because specific marine examples are generally not provided, use of the Florida Marine Education Resources Bibliography will help "marinate" subject matter. Note that many of the resources included in the bibliography may already be in school district libraries.

Suggested Topics for Marine Infusion

Grade		
Kindergarten	I.	Habitats
		A. The students' environments
		B. Other animals' environments
	II.	Animals need food to live and grow
First	I.	Habitats - Interrelationships of Living and Non-living Things
	II.	Plant and Animal Resources
	III.	Sources and Forms of Water
Second	I.	Water
		A. As essential to life
		B. As an agent of change
	II.	Food Chains
		A. Seen as energy source
		B. Animal dependence on plants
		C. Man's involvement in food chains
	III.	Animals Growth and Change (including change in form)
Third	I.	Communities: What Are They?
		A. How animal's structure and function effect survival in a community?

B. Interaction and interdependence of community members
C. How animal behavior is influenced by its environment

II. Three-fourths of the earth is salt water

III. Food from the ocean

Fourth

I. Climate: Effects of Oceans, Hurricanes

II. Physical Features of Oceans
A. Mountains, fracture zones, canyons
B. Sea/land interface

III. Algae Components Used in Everyday Products

IV. Fossil Indicators of Past Life on Earth: Florida's recent history as sea bottom

Fifth

I. Ecosystems
A. Describe and define
B. Trace energy flow
C. Construct food webs

II. Classification: Distinguish Vertebrates from Invertebrates; list major vertebrate types

III. Water Cycle

IV. Compare different types of rock formation; reefs

V. Forces that can change the land; coastline, beach

VI. Compare algae with flowering plants

VII. Introduce maps, including navigation charts

Sixth

I. Meteorology: Effect on Weather and Ocean Waves
A. Land and water heat and cool differently
B. Earth's rotation
C. Sun

II. Gravity, Moon, and Tides

III. Plant adaptations to varying sunlight, water temperature, gravity

IV. Animal migration, biolocks, learning, adaptations, instincts, response to changing conditions

Seventh/ Eighth

Natural Science

I. Ecosystems and their Organisms
A. Estuaries
B. Beaches
C. Intertidal zone
D. Oceanic zones

II. Photosynthesis
A. Basic principles
B. Significance of food and oxygen production

III. Protists, Algae, Fungi, Bacteria, Higher Plants
A. Structure
B. Function

IV. Invertebrate and Vertebrate Animals
A. Structure
B. Function
C. Lifestyle

V. Reproduction in Representative Phyla

VI. Effect of Man's Activities on the Environment
VII. Careers

Physical Science

I. Physical and Chemical Properties of Water
   A. Universal solvent
   B. Natural waters as chemical soup
      1. Salt
      2. Fresh
      3. Brackish
   C. Temperature, rates of change
   D. Density, buoyance, pressure
   E. Sound transmission
   F. Light transmission
II. Techniques and Equipment for Sampling and Measuring
III. Careers

Earth Science

I. Ocean Bottom
   A. History of formation
   B. Seafloor spreading
   C. Rock types, rock cycle
   D. Major topographic features
II. Water as a Force for Change
   A. Tides
   B. Currents
   C. Waves and wind
   D. Materials transport
   E. Hydrologic cycle
III. Energy Sources
IV. Techniques and Equipment for Sampling and Measuring
V. Careers

Ninth-Twelfth

Each of the major headings can be infused into another science course or they may be put together to form two, semester-long courses in marine science.

Marine Science: Sections I-VII, XI
Marine Biology: Sections I, VIII-XI

I. Introduction
   A. History of oceanic exploration; principal explorers, scientists, and voyages contributing to present knowledge
   B. Technology of oceanic exploration and exploitation
      1. Navigation
      2. Submersibles
      3. Diving
II. Geology
   A. Theories of oceanic origin
   B. Plate tectonics
   C. Sea bottom, topographic features, sediments
   D. Equipment and techniques used for study

E. Resource exploitation

III. Physical and Chemical Properties of Sea Water
- A. Pressure, temperature, density, heat capacity, light absorption
- B. Salinity, pH, carbonate buffer, dissolved gases
- C. Interrelationships of abiotic properties--change in one may change others
- D. Equipment and techniques used for study

IV. Physical Oceanography
- A. Coriolis effect
- B. Oceanic currents; surface and deep
- C. Tides
- D. Winds and waves
- E. Upwellings
- F. Water cycle
- G. Effects on climate, hurricanes
- H. Equipment and techniques used for study

V. Ocean/Land Interface
- A. Sand transport, littoral drift
- B. Beach and dune formation, erosion, stabilization
- C. Inlets to the sea; river deltas, breaks in island chains
- D. Barrier islands, estuaries, salt marshes and swamps
- E. Equipment and techniques used in study

VI. Marine Resources
- A. Historical dependence on the sea
- B. Mineral resources, equipment and techniques used for recovering
- C. Living resources, equipment and techniques used for recovering
- D. Energy resources, equipment and techniques used for recovering

VII. Impacts of Man on the Sea
- A. Undesirable effects of resource exploitation
- B. Unwise use of living resources
- C. Physical, chemical, thermal pollution
- D. Altering shorelines; seawalls, dredging, coastal construction
- E. Altering water flow; channelizing, damming rivers, causeways, diversion of freshwater runoff

VIII. Ecology
- A. Foodchains, food webs, energy flow, trophic levels
- B. Biogeochemical cycles and interrelationships
- C. Effects of water mixing, currents, upwellings on marine organism lifestyles
- D. Marine zonation, depth and distance from shore, lifestyle of benthos, plankton, nekton
- E. Ecosystems
  1. general; polar, temperate, tropic
  2. specific; physical, chemical, biological components of:
     - a. beaches and dunes
     - b. marshes and swamps
     - c. estuaries

d. reefs
e. pelagic and abyssal

IX. Biology
A. Taxonomy; nomenclature, classification basis, dichotomous keys
B. Phyla; classification, anatomy, physiology, habitats, economic importance of:
1. Protists
2. Algae, higher plants
3. Porifera
4. Coelenterates, ctenophores
5. Mollusks
6. Anthropods
7. Echinoderms
8. Worm type phyla
9. Bryozoans
10. Chordates
a. urochordates
b. hemichordates
c. fish
d. reptiles
e. birds
f. mammals
C. Endangered species

X. Mariculture

XI. Man and the Sea
A. Careers, marine related industry
B. History of man's dependence on the sea and coast
1. Influence of settlement and population growth
2. Food
3. Transport
4. Recreation
5. Aesthetic values
C. Future of the seas, marine exploitation, marine resources

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